THE PYRAMID AND THE PSYCHOTHERAPEUTIC RELATIONSHIP*

MICHAEL BALINT
M.D. Budapest, Ph.D. Berlin, M.Sc. Manc., L.R.C.P.E.
CONSULTANT PSYCHIATRIST, TAVISTOCK CLINIC, LONDON, W.1;
HON. CLINICAL ASSISTANT, DEPARTMENT OF PSYCHOLOGICAL MEDICINE, UNIVERSITY COLLEGE HOSPITAL, LONDON

BY far the most important psychiatric task of the general practitioner is to understand his patient and to use his understanding with a therapeutic effect. His most important method is psychotherapy. Though the practitioner may use drugs, their value is incomparably smaller than that of properly understanding the patient and his problems and of handling him better on the basis of this understanding.

As we all know, a large proportion of patients asking help from their doctors or from outpatient departments are not suffering from any organic illness but from emotional disturbance. Even if we accept the lowest estimate, which puts this proportion at 10%, we are faced with an immense and disquieting problem because most medical schools or teaching hospitals do not offer their students a systematic training in psychotherapy. Imagine the indignation if it were discovered that medical training completely disregards a pathological condition from which at least 10% of all patients suffer!

Teaching of Scientific Medicine

During the past two hundred years or so the only acceptable form of medical thinking has been the scientific. Originally this meant one based on a close study of anatomy, but a few decades later physiology was added. As medical progress advanced, our thinking was influenced more and more by our study of histology, physics, and chemistry; and today statistical considerations seem to have the last word. Now all these are analysing sciences—they study the parts and then try to understand the whole as the sum of the parts—and I believe this to be the prevailing method of thinking in medicine.

Consider the model on which every student learns how to treat a patient properly—the inpatient treatment in a teaching hospital.

When a patient comes in, the nurse takes the weight, pulse-rate, and temperature, inquires about the opening of the bowels and (if a woman) the date of the last period, and then repeats these examinations or inquiries regularly as prescribed by the hospital routine, daily or weekly. Next, the house-physician or house-surgeon takes a medical history, examines the patient physically, and usually takes his blood-pressure. All these are checked by the registrar, who then decides whether it will be sufficient to do the routine urine tests on the ward or send a sample to the pathological laboratory. If necessary blood-tests and various chemical examinations are asked for from the pathologist, and in certain cases the basal metabolic rate or radio-iodine intake is estimated, involving as a rule another pathologist. Often X-rays will be desirable, which are done by a radiologist or by his technicians. A further proportion of patients will need an electrocardiogram or an electroencephalogram, involving the collaboration of further specialists. This process is called in the hospital jargon "working up the patient". The results of all these part-examinations are then collected and presented to the consultant, who tries to understand the whole by studying carefully all the parts.

The system works on the basis of distribution of labour by delegating part-functions to various specialists. This is done in every case: complex difficult cases mean that several consultants will be involved, but the principle remains the same.

Undoubtedly this system has enormous advantages. It is highly efficient because every member is in constant control by several other members; each of its members—except perhaps the top-ranking consultants—is fairly easily replaceable without upsetting the smooth running of the system; the delegation of part-duties to reliable hands achieves enormous saving of time in the higher ranks; and last but not least, this system is very suitable for the teaching of medicine—that is to say, a certain kind of medicine.

Unfortunately there are also some undesirable side-effects. The first is the splitting of medicine into an ever-increasing number of specialties, among which the patient is parcelled out. One consequence is that when a practitioner comes to the conclusion that the whole patient is ill—not just his stomach, the kidney, spinal cord, or reticuloendothelial system—he has great difficulty in finding anybody who can give him advice.

Another side-effect is that the patient relates not so much to an individual doctor as to the system itself, or at most to one or other of the hierarchical ranks in the system. By its nature this relationship will be always somewhat formalistic and detached, as is apparent from the custom by which the higher ranks in the hierarchy hardly ever see the patient alone. Consultants and senior registrars are usually accompanied by a junior doctor and one or two nurses, the matron by a sister or another nurse. Though every hospital has screens to protect the patient against loss of privacy by sight, there are very few hospitals indeed—anywhere in the world—where a doctor may talk to his patient safe in the knowledge that their confidential conversation will not be overhead. Admittedly the situation is better in the outpatient departments; but even there it is far from being what it should be. Thus our hospitals are true expressions of our way of thinking in medicine—namely, that the patient's body must be respected, but that his emotional life is either not worth examining or, if it is, can be examined in public.

All this creates several levels of communication between the patient and the various ranks of the hierarchy. Quite different things are told, on the one hand, to the houseman, registrar, and consultant, and, on the other hand, to sister and the young nurse; and still others to the night nurse if she cares to listen. Still other things, however, cannot be told at all, or only with very great difficulty.

A young registrar told me that a few days after he took up his appointment he was ticked off by his consultant because the medical history of a weepy and depressed woman did not

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contain anything about the possible causes of her depression. As the general ward did not seem to the registrar a suitable place for this sort of examination, he waited until the evening and asked the woman to come with him into a small hall which was used by patients only by day. The interview proved to be very sticky and he could not make any progress. Gradually he got the impression that an unhappy love affair might be in the background, and he tried hard to find out whether his surmise was correct; but the only thing he could achieve was an increasing tension in the woman, who eventually broke down crying " I can't tell you, I won't tell you. I told it in the last hospital to my doctor and next day the whole hospital knew it ". Of course, she was quite right. What she told her doctor became part of the medical history, was entered into her files, and was read by the whole hierarchical team. What else could or should have been done?

Preparation of the Doctor

This is the medicine—the scientific medicine—that our medical students have to learn. Proper and painstaking examinations by expert specialists, and then, as a second step, integrating the results of these part-examinations into a total picture of an illness. And, lastly, becoming familiar with an atmosphere in which relationship is between the patient on the one hand and a hierarchical organisation, an establishment, on the other.

This is the atmosphere in which the medical student lives during his formative years, which is kept in front of his eyes as the way medicine should be practised. If he chooses to become a specialist, and succeeds in doing so, this is the way he will practise medicine—though he may be forced to make allowances if his hospital lacks some of the facilities of a teaching hospital. But the whole situation will be utterly different for a general practitioner. He will have to work outside a hierarchical establishment, on his own with no sister to look after him, and with no consultant to ease his responsibility or to demand proper standards from him. That is why most general practitioners become a kind of exile, always homesick for their mother country, the teaching hospital. In consequence they try to run their practices as minor hospitals with at least one nurse, feeling that they have been unfairly downgraded because they have no access to hospital beds and very inadequate laboratory facilities. Though these recriminations have some justification, their intensity is greatly exaggerated by the emotional factors.

This also explains why so many general practitioners fail to realise the full scale of their possibilities as regards mental health. They are quite willing to act as they have learnt to act in their teaching hospitals, as house-physicians or as registrars to their psychiatric consultants, but they seem to be unwilling, or perhaps unable, to undertake any further responsibility. They are quite prepared to keep an eye on a patient, to provide him with some drug as advised by the consultant, and even to collaborate amicably with the various aftercare services of the community; but very few are prepared to go any further.

To go further would mean an attempt at understanding the patient's emotional problems—which can be done only if a special kind of relationship between patient and doctor is allowed to develop. To differentiate this from the better-known doctor-patient relationship I shall call this a psychotherapeutic relationship.

The Psychotherapeutic Relationship

The Doctor

Psychotherapy is not so much knowledge which can be learnt from books or lectures but a personal skill. This is equally true, of course, of surgical technique. Why then does training for psychotherapy appear to be much more difficult to integrate into the classical system of medical training than training for surgery? The reason is that the psychotherapeutic task is a whole and cannot be parcelled out as can the surgical procedure between the surgeon proper and his assistants. In surgery if a beginner runs into difficulties, he can hand over the scalpel to his teacher, resuming the operation after the difficulties have been overcome; but this is well-nigh impossible in psychotherapy. The situation in psychotherapy is like that in ski-ing. It would be nice to arrange that the beginner should do only the straight runs and hand over the turns to his instructor; but unfortunately this is impossible and the whole run has to be done by the beginner from start to finish. Moreover, whereas in ski-ing it is easy to take the budding skier to slopes which try his skill but not overtax it, this is much more difficult in psychotherapy, where one cannot be certain what difficulties will arise in a patient's treatment.

To work in a hospital as a member of the therapeutic team may be exacting and strenuous, but the emotional stake of any one member of the team in any one patient is not very great. In a psychotherapeutic relationship, on the other hand, there is no sharing of responsibility: the whole therapy must be carried out by one doctor. Furthermore, he must enter into a personal relationship with his patient, because it is this that creates and maintains the psychotherapeutic process. In psychotherapy the doctor's personality is his tool, and just as a surgeon must learn how to use his knife, the psychotherapist must learn how to use his own personality. This presupposes a considerable (though limited) change in the doctor's personality. The present training system for students does not pay much attention to these demands.

The Patient

The personal relationship which is the essence of any psychotherapy is entirely different from relationship with a team. Where there is a team the patient's communications are distributed in a somewhat haphazard way among the various members, in the same way as his emotions become scattered or diluted. All this makes recognition of his psychological problems much more difficult, and the difficulty is increased by the uncanny power of some patients of playing off one person against the other. The stricter and stiffer the hierarchical organisation, the greater is this danger.

The Psychotherapeutic Process

Admittedly many forms of relationship may be used for therapeutic purposes, but the one that has been studied most is that between one patient and one therapist. Conversely this means that, for the time being, this is the best understood relationship and thus offers the best opportunity for teaching. The next best studied therapeutic configuration is that obtaining in group therapy—i.e., between one therapist and a group of patients. Our knowledge of the dynamics of this situation is, however, much less reliable than that of the simple two-person psychotherapeutic relationship. No doubt the relationship of the patient to a hierarchical team, which is the characteristic one in a teaching hospital, also has some psychotherapeutic potential; but unfortunately this has not been studied at all, and we have no proper idea of its possibilities, limitations, and indications. Hence, if anyone wants to learn the technique of psychotherapy he has to learn it in the therapeutic situation which has

already been studied—i.e., a two-person relationship involving considerable concentration of feeling and intensity of emotions.

The Pyramid

The present training of medical students is based on the hierarchical system which may be likened to a pyramid, with the consultant at the top. In the early stages of his training the student is given menial tasks near the base of the pyramid, and while he is learning the necessary skills he can watch the work of the other members of the team who are nearest to him. In due course, he will be detailed to more complex duties, and can watch the work performed at still higher levels, and so on.

The simile of the pyramid can be used to illustrate another point. If we suppose that a patient has to relate to a team consisting of doctors, nurses, students, laboratory assistants, physiotherapists, radiographers, &c., who are organised in a pyramidal structure, then the freedom of each member to respond to the patient's need with a personal relationship will be restricted—among other things—also by his position in the pyramid. Members who occupy an inside position, such as the pathologist or the radiologist, may not see the patient in the flesh at all. Those near the base will have perhaps a close but much too restricted view of him or only parts of him, while those higher up, especially when near the top, though having an unobstructed view, may have one which is much too distant or is even considerably distorted by the great difference in levels.

Unfortunately these factors seem to be inseparable from one another: the highly efficient, reliable and economical organisation of the teaching hospital; the system of training medical students which permits the delegation to them of part-duties which correspond to their actual stage of development; and the restriction of personal relationship to the patient imposed on the various doctors by their position in the hierarchical pyramid. If we want to train the future doctor for his coming role in mental health—i.e., enable him to understand his patients and to use his understanding with a therapeutic effect—then we must offer him a chance to study a proper psychotherapeutic relationship; that is, one in which all communications are concentrated between one therapist and one patient. In such a relationship there can be no delegation of responsibilities and no part-duties.

We need, therefore, a new method—not to replace the classical training, but in addition to it.

Three Requirements

This new method has to satisfy three requirements which at first sight seem incompatible. The first is that the student should maintain a continuous therapeutic relationship with his patient, which should remain free from any disturbance by another doctor so that the student should be able to observe and understand how and why it changes and develops. This presupposes that the student has reached a stage in which a patient's treatment can be entrusted to him. The second is that the student should be given ample opportunity for checking the validity and efficiency of his technique, and that his supervisor should be able to watch the student's development fairly closely so that he should be able to intervene and help him whenever necessary. The third is that the student should be able to observe the consultant at work.

These three requirements can be met, although the third only in an indirect way. The first two are satisfied by arranging the training of students in groups in which (*a*) each participant has undivided and continuous therapeutic responsibility for his patients and (*b*) each student is offered ample opportunity for reporting his own observations and also for following the work of his fellow students. As to the third requirement, the consultant conducting the group will demonstrate a good deal of his psychotherapeutic skill by his way of responding to the material presented to him. He will do this not so much by what he *tells* the students to do or to refrain from doing, but by the *way* he makes his remarks—i.e., by the way he behaves in the seminar. True, what the students will observe is the consultant's teaching skill in a group, not his psychotherapeutic skill in a two-person relationship; but in spite of this difference the students will see him at work and will be able to watch his spontaneous reaction to live case material.

For the postgraduate training of fully qualified doctors these three requirements have been integrated in the method worked out by Enid Balint and myself at the Tavistock Clinic, London. This is based on regular weekly discussion seminars lasting about two hours, for about 36–40 weeks per year. The total length of the course is two to three years (or even longer), the length of training depending on the degree of proficiency that the doctor wants to attain.

The meetings are quite informal without any fixed agenda. The doctors are asked to report about any observation in their practice, especially about complicated or difficult patients; these reports are then discussed by the various members of the group with special emphasis on what sort of therapy each patient might require, and how the patient will respond to that particular therapy. Of course there are always some differences of opinion, and in this way the doctor learns to see himself and his professional behaviour constantly in contrast to others. The succeeding seminars demonstrate to him the immense variations in possible therapeutic approaches, and since we try to follow up the cases reported the doctors learn also about the efficacy and the limitations of the various therapeutic approaches. Moreover, while the doctor reports himself or listens to the reports of his colleagues, he not only understands but also becomes aware of his feelings—i.e., he realises his own contributions and his own emotional involvement in each case. As during the whole time he is under constant pressure of his therapeutic responsibility towards his patient, he cannot help—sooner or later—but experiment with one or the other therapeutic attitudes that he has heard reported in the seminars. Patients are quick to sense any such change and their changed reaction cannot fail to impress the doctor.

Of course, not every new method adopted by the doctor will be successful, and not every changed reaction in the patient will be in a therapeutic direction. Still, failures as well as successes leave their mark, which in turn teach the doctor something about the better use of his own personality in the psychotherapeutic relationship. All these influences add up and result in the limited though considerable change of personality mentioned above, which is the basis of every psychotherapeutic skill.

The Training of the Student

This method will not be easy to integrate into the hierarchical system of the teaching hospital. It is incompatible with delegation of part-duties and the students cannot rotate according to a prearranged timetable leaving their patients every six weeks or three months and handing them over to a new lot of students. This difficulty is certainly one of the reasons why it has not yet been introduced to any teaching hospital, although in my opinion it could be run as an additional (almost indepen-

dent) course, parallel to the traditional rotation of students among the various specialties. A further important difficulty would be the differing rate of development of students. Some may be able to shoulder considerable therapeutic responsibility at a time when others of their contemporaries have not yet reached that stage. This certainly has to be watched; but, provided the tutor understands his job, the difficulties will not be insurmountable.

One question that arises is: Should this sort of training be compulsory for all students. My answer is that it possibly should not; it should be offered as an elective course for those who volunteer for it. The reason is simple. Neurosis and psychosis are to be found among doctors, and for that matter among medical students, at least in the same proportion as among the general population. For those who are afflicted in this way a course which demands a change of personality might be too strenuous or even highly undesirable. Then there are many students who will choose as their career either the scientific laboratory or some administrative job, which means that they will never have any therapeutic responsibility for a patient. To demand that they should learn psychotherapy would be as uneconomical as to demand from every doctor to master the skills of heart surgery or of a complicated neurological differential diagnosis. On the other hand, it might be advisable to demand that every doctor who contemplates becoming a general practitioner should take this course.

The other problem is whether this sort of training is necessary everywhere. There are still communities where the standards of physical hygiene and medical care are very low, where the control of infectious diseases hardly exists, where malnutrition is rampant, and where the expectation of life is far below the average. It can be argued that in these communities it is more important to help the population to raise the standard of public health—i.e., the quantity of life available to every individual—than to improve the quality of life. Against this it may be said that an understanding of emotional problems is essential to all medical care, and that therefore all doctors require some training in the psychotherapeutic understanding of the patient.

These ideas are being tried on a small scale in the training of medical students at University College Hospital, London. The results so far are encouraging.

THE VACUUM EXTRACTOR IN THE TREATMENT OF DELAY IN THE FIRST STAGE OF LABOUR

PETER J. HUNTINGFORD
M.B. Lond., M.R.C.O.G.
SENIOR LECTURER IN OBSTETRICS AND GYNÆCOLOGY, ST. THOMAS'S HOSPITAL, LONDON, S.E.1

FROM time to time since the 18th century attempts have been made to expedite labour by applying a suction cup to the baby's head (for a historical review see Chalmers 1961). The principle was revived in 1953 with the instrument designed by Malmström (1954, 1957). Since then the vacuum extractor has been used in the second stage of labour (Meinrenken and Schieferstein 1957, Evelbauer 1958, Roloff 1959, Chalmers and Fothergill 1960, Kessler 1961); as a means of treating delay in the first stage of labour (Malmström 1954, Meinrenken and Schieferstein 1957, Chalmers and Fothergill 1960, Hochuli and Stöckli 1960); to deliver breech presentations (Berggren 1958, Evelbauer 1958, Chalmers and Fothergill 1960, Hochuli and Stöckli 1960); at cæsarean section (Feuerstein 1960); and to facilitate the delivery of large ovarian cysts at laparotomy (de Boer 1960). The first two of these indications are much the most important; very few breech presentations have been delivered with the vacuum extractor, and the other applications of the instrument, although ingenious and novel, are really unnecessary. Many have suggested using the vacuum extractor to terminate the second stage of labour in all patients who would otherwise have had a forceps delivery, thereby replacing forceps completely (Rosa and Piraux 1957, Barben 1958, Evelbauer 1958, Kessler 1961); but others have recommended its selective use (Meinrenken and Schieferstein 1957, Fauvet 1958, Roloff 1959, Hochuli and Stöckli 1960), saying particularly that it should not be used in cases of fœtal distress, because delivery can be achieved much more rapidly with forceps (Chalmers and Fothergill 1960).

I shall not discuss whether the vacuum extractor should replace forceps, which have been the conventional means of solving problems in the second stage of labour for very many years. But I shall devote this paper to the second main use of the vacuum extractor—namely, the treatment of delay in the first stage of labour. Until now the only satisfactory method has been cæsarean section; the vacuum extractor offers an alternative. There is no doubt that the vacuum extractor can be used in the first stage of labour to deliver the baby per vaginam; but, before this manœuvre is regarded as preferable, it is essential to show that for both the mother and the baby it can produce results which are as good as, if not better than, cæsarean section. These must be assessed not only in terms of mortality but also of morbidity. The experiences recorded here are intended as a commentary on these problems.

The Patients

Experience with the vacuum extractor has been gained since May, 1960. It was used at first to terminate the second stage of labour in patients who would otherwise have required a low-forceps delivery, and later in those who had failed to make progress because of malrotation of the occiput. When the instrument had become familiar under these circumstances its use was extended to patients who had been in the first stage for some considerable time without making satisfactory progress as judged by failure of the cervix to dilate and/or the head to descend. Bony disproportion was excluded as far as possible, the failure of progress being attributable to an abnormality of uterine action. The time chosen for trial of the vacuum extractor was determined either by the appearance of signs of maternal distress or by the fact that progress had been halted for so long that further advance seemed unlikely within a reasonable time. Had the vacuum extractor not been used, all these patients would have been delivered by cæsarean section, for the same reason and at about the same time. Indeed, in every case a resolve was made that cæsarean section would be performed if delivery was not achieved by means of the vacuum extractor.

The vacuum extractor was used to treat delay in the first stage of labour in eleven patients; the details are summarised in tables I and II. All but one of the patients were nulliparous. The length of gestation varied between 38 and 44 weeks. In only one patient was the occiput anterior when the extractor cup was applied; in the remainder the occiput was either directly lateral (seven cases) or posterior with the sagittal suture in an oblique diameter (three cases). No deliberate effort was

TABLE I—THE MOTHERS

Case no.	Age (yr.)	Parity	Gestation (wk.)	Length of labour (hr.)	Dilatation of cervix	Position of head	Duration of traction (min.)*
1	23	0	41	46	4 fingers	L.O.L. at spines	30
2	23	0	?44	86	4 ,,	L.O.P. at spines	13
3	27	0	42	56	4 ,,	R.O.L. above spines	25
4	25	0	40	66	4 ,,	L.O.A. 1 in. below spines	45 (forceps)†
5	33	0	38	42	4 ,,	L.O.L. at spines	45
6	31	0	38	58	3 ,,	R.O.P. at spines	70
7	26	0	40	60	Three-quarters	R.O.L. at spines	30
8	32	0	41	58	4 fingers	R.O.L. below spines	60
9	28	0	39	26	4 ,,	L.O.L. at spines	75 (forceps)†
10	26	1	?44	56	4 ,,	R.O.P. above spines	30 (cæsar.)†
11	23	0	41	51	Three-quarters	L.O.L. at spines	25

The indication for use of the vacuum extractor in all these patients was failure to progress in labour attributable to a fault in uterine action.
* The duration of traction = interval between application of the suction cup and the delivery of the baby.
† These patients were eventually delivered by the method indicated.

made to correct malrotation, but all the babies delivered with the vacuum extractor were eventually born with the occiput anterior, spontaneous rotation having taken place either in the pelvic cavity (three cases) or on the pelvic floor (five cases). In eight patients the cervix was 4 fingerbreadths dilated (about 8 cm.), in one patient it was only 3 fingerbreadths dilated (about 5 cm.), and in two there was a very thick rim of cervix all round the head. In eight patients the head was in mid-cavity, at or just above the level of the ischial spines; in two it was below the spines; and in one it was above the brim of the pelvis.

The Technique of Using the Vacuum Extractor

The patients were told of the manœuvres contemplated. They were placed in the lithotomy position, swabbed, and draped, and the bladder was catheterised. Trans-vaginal or transperineal pudendal block was performed, using 1% lignocaine hydrochloride. Some of the patients, particularly if they were nervous, were then given an intravenous injection of pethidine 50 mg. together with chlorpromazine hydrochloride 12·5 mg.; these mothers were also given nalorphine hydrobromide 10 mg. intravenously after the cervix had become fully dilated and just before the baby's head was crowned.

The medium-sized suction cup (42 mm.) was used in all the cases, and whenever possible it was applied over the vertex (in its strict anatomical sense). In most its correct application was confirmed after delivery, although in three babies who presented with the occiput laterally the cup had been applied over the anterior parietal bone. After the cup was applied, care was taken to ensure that neither the cervix nor the vaginal wall had been trapped between it and the baby's scalp. The cup was held in place with the fingers of one hand, while the application was checked with the other.

A vacuum of −5 in. Hg (−125 mm. Hg ≡ 0·2 kg. per sq. cm.) was then induced by the hand pump, and the application of the cup was checked again. Over the next 3–5 minutes the vacuum was increased to a maximum of −20 in. Hg (−500 mm. Hg ≡ 0·8 kg. per sq. cm.). Traction was exerted to synchronise with the contractions of the uterus. Between the contractions traction was released, although not completely, and a sufficient pull was maintained to ensure that the progress gained was not lost. If there were no contractions within a reasonable time of applying the instrument (about 10 minutes), gentle traction would stimulate the uterus. In these patients about 3 minutes was allowed to elapse between each pull. If the patient made expulsive efforts, and this invariably happened once the cervix had become fully dilated, she was encouraged to do so when traction was exerted. The cervix disappeared remarkably quickly.

In six patients the suction cup was pulled off, and in three of them more than once, but this was almost certainly due either to pulling in the wrong direction or to using too much force. With experience this complication became less common. Reapplication of the cup, after it had been pulled off, was particularly liable to be complicated by inclusion of the vaginal wall between the cup and the scalp. An episiotomy was made in every case at the crowning of the head.

Maternal Results

Delivery was completed in five of the eleven patients within 30 minutes (table I). In three spontaneous rotation of the head took place, and the babies were delivered with the vacuum extractor after 45, 60, and 70 minutes' traction. In one patient (case 4) traction was exerted for 45 minutes without the head descending, although the cervix was fully dilated, and delivery was completed under general anæsthesia by forceps extraction; this was the only patient with an occipitoanterior position. Another patient (case 9) was delivered under general anæsthesia by forceps rotation and extraction after 75 minutes' traction, because the head failed to descend and rotate although the cervix became almost fully dilated. The remaining, and only multiparous patient (case 10), was delivered by cæsarean section after 30 minutes' traction because the head failed to descend although the cervix became almost fully dilated. An attempt to deliver the baby with forceps under general anæsthesia also failed. The baby weighed 10 lb. 3 oz.: the mother had previously been delivered with forceps of a baby weighing 8 lb. 6 oz.

TABLE II—THE BABIES

Baby no.	Sex	Birth weight (lb. oz.)	Findings at site of suction cup	State at birth	Further progress
1	M	7 0	Chignon†	Severe white asphyxia: endotracheal intubation	Died after 24 hours: intracranial hæmorrhage
2	M	8 4	Occipital cephalhæmatoma	Severe blue asphyxia: endotracheal intubation	Normal
3	M	8 8	Cephalhæmatoma	Vigorous	Cerebral irritation for 3 days
4*	F	7 7	Chignon + laceration	Mild blue asphyxia	Normal
5	M	7 3	Chignon	Vigorous	Normal
6	M	7 0	Laceration	Vigorous	Normal
7	M	8 14	Laceration	Mild blue asphyxia	Cerebral irritation for 2 days
8	M	7 0	Laceration + cephalhæmatoma	Vigorous	Cerebral irritation for 2 days
9*	M	7 9	Laceration (became infected) + cephalhæmatoma	Severe blue asphyxia: endotracheal intubation	Cerebral irritation for 5 days
10*	M	10 3	Chignon	Severe blue asphyxia: endotracheal intubation	Died after 72 hours: aspiration of meconium and atelectasis
11	M	7 9	Chignon	Mild blue asphyxia	Normal

* Babies 4 and 9 were eventually delivered with forceps, and baby 10 by cæsarean section.
† "Chignon" = the artificial caput succedaneum produced by the suction cup.

One of the patients eventually delivered with forceps (case 9) had a spiral tear in the posterior fornix which was easily repaired. Two patients (cases 3 and 9) had small cervical tears that healed satisfactorily without being sutured. There were no other maternal injuries. The episiotomies all healed by first intention. The patients tolerated delivery with the vacuum extractor very well, and they all cooperated by bearing down with their contractions when the cervix was fully dilated.

At postnatal examination the genital tract was found to have involuted satisfactorily in all the patients, and apart from scarring in the vault of case 9, no evidence of injury was seen. None of these patients has yet become pregnant again, and assessment of the competence of the internal cervical os has not been made.

Fœtal Results

Seven of the eleven babies were born in good condition, and regular respiration was established within 3 minutes of birth with no other encouragement than mucus extraction and administration of oxygen through a funnel (table II). The other four babies were severely asphyxiated and they required endotracheal intubation and insufflation with oxygen before respiration was established satisfactorily.

Two of the eleven babies died. The baby (case 10) who was eventually delivered by cæsarean section died at 72 hours; postmortem examination showed that death was due to atelectasis caused by the aspiration of meconium; apart from a hæmatoma of the scalp there was no sign of intracranial damage. The other baby (case 1) died of intracranial hæmorrhage:

Postmortem revealed a circular area of congestion 6 cm. in diameter over the vertex, beneath which was a large hæmatoma of about 8 cm. diameter (fig. 1). Below this the periosteum had been raised and separated from the skull by another hæmatoma 5 mm. deep over an area 6 cm. in diameter. Deeply bloodstained fluid and some blood-clot was found in the subarachnoid space. The free margin of the falx cerebri was intact, but in the falx was a roughly circular tear with a ragged edge directly beneath the subperiosteal hæmatoma. The hole in the falx was 1–2 cm. in diameter, and about 1 cm. away from both the free and the attached borders. There was some extravasation of blood between the layers of the falx around the tear. The tentorium was intact. The brain was soft, but its external surface was normal, and there was no hæmorrhage into its substance. No other abnormalities were found.

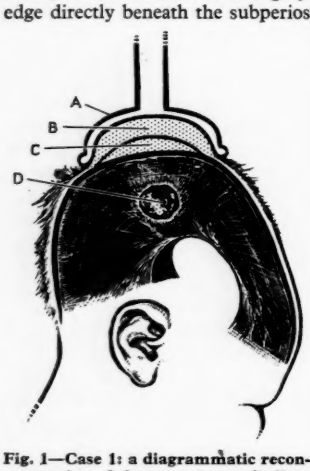

Fig. 1—Case 1: a diagrammatic reconstruction of the postmortem findings in the infant.
A = suction cup.
B = hæmatoma beneath the scalp.
C = subperiosteal hæmatoma.
D = circular tear in the falx cerebri; this was occupied by blood-clot, which also extended between the layers of the falx, and the subarachnoid space contained bloodstained fluid.

Four of the nine surviving babies showed signs of cerebral irritation after birth (irritability, photophobia, a high-pitched cry, neck stiffness, and a positive Moro's sign). In two babies the symptoms cleared within 48 hours of delivery, but one remained irritable for 3 days and another for 5 days. They were treated by sedation with phenobarbitone, and they were nursed in cots. Examination up to the age of 3 months revealed no signs of permanent damage, and their later progress was normal.

Fig. 2—Case 9: the baby aged 9 days.
A typical circular abrasion of the scalp at the site of application of the suction cup. There was some infection beneath the crusts.

All the babies had a pronounced " chignon " (Rosa and Piraux 1957) or caput succedaneum at the site of application of the cup; this subsided within 24–48 hours of birth. Four babies (cases 2, 3, 8, and 9) had a cephalhæmatoma; two of these (cases 8 and 9) and three others (cases 4, 6, and 7) had a circular abrasion of the scalp (fig. 2) at the site of the edge of the metal suction cup. In case 9 the abrasion became superficially infected, but it eventually healed after 14 days; in the other four babies the crusts over the abrasions were beginning to separate when they were discharged 10 days after birth.

Discussion

One of the commonest indications for cæsarean section today is delay in the first stage of labour in a primigravida. Many of these babies are postmature, and they present with the occiput posteriorly. In most cases there is no bony cephalopelvic disproportion, as borne out by their performance in later pregnancies which generally end normally and without assistance. The problem is one of abnormal uterine action. This may occasionally be solved by an intravenous infusion of oxytocin; but not always, because (although contractions may be provoked) either the cervix still fails to dilate satisfactorily or maternal and/or fœtal distress forces the obstetrician to perform a cæsarean section. The vacuum extractor provides an alternative solution.

The results presented here, and those of many previous workers (Chalmers and Fothergill 1960, Kessler 1961, Lauridsen 1961) show that vaginal delivery can be achieved with little discomfort to the mother, and without even exposing her to the hazards of general anæsthesia. From the maternal point of view the risk of injury is small; the rate of success is high, and even if there are some failures, enough progress is often made to allow delivery to be safely completed with forceps. In an occasional patient failure may be complete, but cæsarean section can still be performed without great added danger to the mother. Failure to deliver the patient with the vacuum extractor is almost always due to previously undetected disproportion; this was so with case 10, and it has been the experience of others (Hochuli and Stöckli 1960, Kessler 1961).

Thus for the mother the vacuum extractor seems to fulfil its promise in treating delay in the first stage of labour. Its advantages can be summarised as follows:

A number of cæsarean sections can be avoided, thus directly contributing to a reduction in maternal mortality and morbidity.

General anæsthesia is usually unnecessary, which also eliminates another hazard of childbearing, as well as conferring on the mother the psychological advantage that she is awake and can cooperate in the birth of her baby.

The discomfort associated with the use of the vacuum extractor is not much greater than that with a normal delivery and episiotomy.

Convalescence is as rapid as after a normal delivery.

One possible disadvantage to the mother must be taken into account. Forced extraction of a baby through the undilated cervix could perhaps cause incompetence of the internal cervical os, with all its consequences. Only a long-term follow-up of patients who have been delivered in this way will enable us to judge whether this is a hazard of practical importance, but which may be justified by the reduction in maternal mortality and morbidity that is inevitably achieved by avoiding cæsarean section. Final judgment must depend on the fate of subsequent pregnancies in patients who have been delivered through an undilated cervix by means of the vacuum extractor.

For the baby the vacuum extractor used for the purpose indicated is much less advantageous. The injury in the baby who died of intracranial hæmorrhage cannot have been caused by anything but the stresses imposed upon the falx during traction with the instrument. I have been unable to find a similar injury reported.

Intracranial hæmorrhage has been described after the use of the vacuum extractor (Berggren 1958, Chalmers and Fothergill 1960, Fürstenberg and Söderhjelm 1960, Hochuli and Stöckli 1960, Smedley 1960), but many workers have been unwilling to blame the instrument for the injuries observed (Lauridsen 1961). Indeed, Snoeck (1960) has even presented mathematical calculations to show that much less strain is imposed upon the septa of the skull during traction with the vacuum extractor than with forceps; and Brey and Fanghänel (1960) have shown that the maximum force that can be exerted with the vacuum extractor is less than that exerted with forceps.

The fœtal morbidity associated with the use of the vacuum extractor has been mentioned by many workers (Rosa and Piraux 1957, Berggren 1959, Evelbauer 1959, Chalmers and Fothergill 1960, Snoeck 1960, Kessler 1961, Lauridsen 1961), but most have minimised its significance. Even if one is prepared to accept the chignon as harmless, surely scalp abrasions that form a potential portal of entry for infection and cerebral irritation cannot be regarded with such equanimity.

It is not my purpose in this paper to condemn the use of the vacuum extractor in the treatment of delay in the first stage of labour—I am still impressed and enthusiastic about its possibilities. Rather is it, as others have done (Martius 1958, Greenhill 1960, *Obstetrical and Gynecological Survey* 1960), to sound a cautionary note and to make a plea for reports of the late effects on the mothers and babies delivered in this way. But if the reports are to be useful they must distinguish between those patients who were delivered before and those who were delivered after full dilatation of the cervix. Except for the possibility of causing cervical incompetence, there seem to be no disadvantages from the maternal point of view. However, the high fœtal morbidity and mortality rate associated with the use of the instrument before full dilatation of the cervix demands that a careful assessment be made before cæsarean section is entirely abandoned in the treatment of delay in the first stage of labour.

Summary

The vacuum extractor was used before the cervix was fully dilated to deliver eleven patients who had failed to progress in labour. In two patients the delivery was completed with forceps, and in one previously undetected disproportion necessitated cæsarean section. In the other patients the results for the mother were entirely satisfactory.

Two babies died, and one of them of intracranial injuries that could only have been caused by the vacuum extractor. Four other babies showed signs of " cerebral irritation " after birth, and five had abrasions of the scalp.

A plea is made for a cautious appraisal of the use of the vacuum extractor in the treatment of delay in the first stage of labour.

I am indebted to Dr. J. A. McMillan for performing the post-mortem examinations, and to Miss Joan Dewe for fig. 1. I am very grateful to the obstetric physicians and pædiatricians of St. Thomas's Hospital for allowing me to publish the details of the cases under their care.

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IMPAIRMENT OF CONSCIOUSNESS IN MIGRAINE

EDWIN R. BICKERSTAFF
M.D. Birm., M.R.C.P.
CONSULTANT NEUROLOGIST TO THE MIDLAND CENTRE FOR NEUROSURGERY, SMETHWICK, STAFFORDSHIRE, AND THE BIRMINGHAM REGIONAL HOSPITALS

" To obviate misunderstanding it should be stated that this conception is put forward only as suggestive, as a subject for thought, and the help thought can give to observation."—Sir WILLIAM GOWERS, 1907.

IT is generally accepted that the clinical syndrome known as migraine is due to changes in the calibre of intracranial and extracranial vessels, causing, in the prodromal stages, transient ischæmia of cerebral tissue, which is followed by excessive dilatation of pain-sensitive arteries during the headache. Many different prodromal symptoms are recognised, their nature depending on the particular vessel involved; and recently I have described a clinical syndrome which seems to occur when the basilar artery bears the main brunt of the disturbance (Bickerstaff 1961):

In its complete form, this syndrome, which predominantly affects adolescent girls and has a strong menstrual association, consists of vivid teichopsia, with impairment or loss of vision

in the whole of both visual fields, dysarthria, vertigo, tinnitus, unsteadiness of gait, and paræsthesiæ in the periphery of both hands, both feet, and around both sides of the mouth and the tongue. This stage is succeeded after 10–45 minutes by throbbing headache, usually occipital, and accompanied by vomiting. Recovery is complete, and examination between episodes normal. These symptoms represent transient dysfunction in the territory of supply of the basilar artery.

When one considers the effects of more profound structural lesions of the brain-stem, however, alteration of consciousness becomes a prominent feature. This is seen in head injuries, after tentorial herniation, in certain brain-stem tumours (Cairns 1952), in brain-stem encephalitis (Bickerstaff and Cloake 1951), and in hæmorrhagic and thrombotic episodes affecting the brain-stem (e.g., Brain 1958). The alteration of consciousness may vary from profound and irreversible coma to drowsiness from which the patient can be roused to full alertness only to sink back again when stimulation ceases. Though the cause of the disturbance of consciousness is still a matter for discussion, the weight of opinion invokes interference with the normal alerting mechanisms situated in the reticular formation of the brain-stem or with its connection with the cerebral cortex. A critical analysis of these viewpoints is given by Brain (1958).

If severe structural vascular lesions of the brain-stem can cause severe irreversible impairment of consciousness, it seems not unreasonable that slight and transient vasomotor disturbances in the same area might produce mild and transient alteration of consciousness. In this paper I want to suggest that patients subject to basilar artery migraine are precisely those in whom this might occur. Among thirty-two patients under the age of 23 with a justifiable diagnosis of basilar artery migraine, eight gave a history of disturbance of consciousness in one or more of their attacks.

Illustrative Case-reports

Case 1.—A girl of 15 had for 12 months had frequent attacks in which her vision became blurred and she saw flashing lights in the right visual field. On other occasions she would become blind in the right eye. These symptoms were succeeded by tingling of the right side of the face and the right hand, and then by severe headache and vomiting. During some of her attacks the flashing lights affected the whole of both visual fields, and the tingling involved both hands and both feet; at the height of six of these attacks she had lost consciousness. Two of these episodes had been verified in hospital, and the other four had been witnessed by her father, who is a male nurse. Each time the unconsciousness lasted about 2 minutes, and it occurred while she was already lying down. During this period she responded to no stimuli, was of normal colour, and had no convulsive manifestations. She recovered very rapidly, afterwards having severe occipital headache and vomiting. Between attacks she was entirely normal, and all investigations were negative, including X-ray of the skull, cerebrospinal-fluid (C.S.F.) examination, arteriography, pneumoencephalography, and electroencephalography (E.E.G.). Both her father and paternal grandfather suffered from classical migraine.

Case 2.—A girl started, when she was 11, to have infrequent attacks in which the periphery of both visual fields became distorted for about 15 minutes, and afterwards she had severe bifrontal headache. At the age of 14, while she was at school, a similar attack developed, but the visual distortion changed to vivid flashing lights of such intensity that she said she was quite blind, having to be led home by two friends. During this walk, which took 30 minutes, she had vertigo and was unsteady on her feet. At the height of these symptoms, she lay down and immediately went into what appeared to be deep sleep from which her mother could not rouse her. This lasted 30 minutes, during which she was examined by a doctor. He found that her colour was normal, and there were no convulsive features; on strong stimulation she could be roused but would sink back to sleep as soon as stimulation ceased. She recovered spontaneously but had intense throbbing occipital headache which lasted several hours. Neurological examination later that day was entirely normal, and the C.S.F., X-rays of the skull, and E.E.G. were normal. Her mother suffered from severe migraine.

Case 3.—A highly intelligent 15-year-old girl, who was an excellent athlete, had for 3 years had attacks of numbness down one or other side of the body, lasting 5 minutes and merging into severe throbbing headache with vomiting, and which were followed by complete recovery. On three occasions, while she was sitting in a classroom, her vision became grey throughout both fields and the periphery of both hands and feet began to tingle. This lasted 10–20 minutes, and she would leave the classroom, finding herself very unsteady on her feet. Other girls said she seemed as if in a dream. She would then sink to the ground unconscious, remaining in this state for about 2 minutes. Afterwards she had severe occipital headache with vomiting, and she was abnormally drowsy for several hours. Examination and skull X-rays were always normal; and, though the E.E.G. was a little immature for her age, it showed no gross abnormality and nothing suggestive of epilepsy.

Case 4.—A 17-year-old girl, who was captain of her school at hockey and swimming, had had attacks for 18 months, often after exertion, consisting of tinnitus, vertigo, vivid flashing lights throughout both visual fields, and an impression as if she were looking through smoke. The symptoms lasted 5 minutes and were followed by severe throbbing headache. After the usual onset she had, on three occasions, lost consciousness at the stage when the headache usually began, and she had remained unconscious, without convulsions, for about a minute, having customary occipital headache on recovery. Examination showed a very unstable peripheral circulation but was otherwise normal, and skull X-rays and E.E.G.s were negative. Her mother and one sister had classical migraine.

Differential Diagnosis

When an apparently healthy young person suddenly loses consciousness, the main problem is to differentiate between simple syncope and epilepsy. If each attack is preceded by a definite aura the suspicion of epilepsy becomes heightened; but, if the loss of consciousness is variable and not profound, and is preceded by a dramatic train of symptoms such as described in these cases, the doctor may not appreciate the anatomical significance of the syndrome, and, faced by an excitable adolescent girl, he may suspect that the whole attack is hysterical.

In these cases knowledge of the syndrome makes it immediately recognisable and distinguishable from hysteria; and the circumstances and position of the patients when consciousness is lost, together with the absence of pallor or pulse alteration, are all quite different from syncope. No one single symptom differentiates it from epilepsy, and it is important to consider the pattern of the disorder as a whole. In my patients a number of features become apparent which make the distinction:

Family history.—All the children had a family history of migraine, and none of epilepsy.

Previous history.—Each child had had other attacks corresponding to the more conventional conception of migraine.

Aura.—The length of the aura far exceeded that usual in epilepsy, lasting up to 45 minutes, and the symptoms always suggested disturbance of brain-stem function.

The loss of consciousness was always curiously slow in onset—never abrupt, and never causing the patient to fall or to be injured. A dreamlike state sometimes preceded unconsciousness. The degree of unconsciousness was never profound and the patients were never unrousable; on vigorous stimulation they could be aroused to good cooperation but they returned

to unconsciousness when the stimulation ceased. This is observed in many brain-stem disorders.

Associated features.—There were no convulsions, incontinence, rigidity, tongue-biting, or changes in respiration.

Headache.—On recovery the patients always had a severe throbbing headache, usually occipital, and similar to that of their more familiar migrainous attacks. It was far more severe than is experienced by an epileptic after so minor an episode. The headache was accompanied by vomiting, after which the attack usually subsided.

Investigations.—E.E.G.s were normal. All radiographic studies, including arteriography in three cases, were negative; and, when examined on the day of an attack, the C.S.F. was normal.

Differentiation by *treatment* is difficult because barbiturates may prevent both epilepsy and migraine; but no patient in this series who has regularly been given prochlorperazine, which has no anti-epileptic properties, has had further attacks while on treatment.

Discussion

The suggestions put forward in this paper are not in any way intended to challenge the well-documented fact that the incidence of epilepsy is greater in the relatives of migraine sufferers than in the general public (Kinnier Wilson 1940, Lennox 1946, Selby and Lance 1960). I do not suggest that simple syncope and epilepsy are not the commonest causes of sudden loss of consciousness in adolescence; but I do suggest that, when the vasomotor disturbance which causes migraine affects predominantly the basilar artery territory, loss or impairment of consciousness may be an integral part of a migrainous attack.

Selby and Lance (1960), in their series of five hundred cases of migraine, found that the incidence of loss of consciousness was 18·5%. 4·5% of these cases appear to have also been epileptics, but the other 14% had attacks of syncope or confusional states. Few details are given of these cases, but some may well have fallen into this group.

One can go much further back than this, however, for Gowers (1907) described the case of a patient who, at the age of 18, began to have right-sided migrainous attacks. After about 10 years the attacks altered; she would lose the sight of both eyes (" a black curtain seemed to be dropped down, brilliant with thousands of golden points "), and she then had severe vertigo, and dysæsthesiæ in the arms, legs, and jaw, all lasting 10 minutes. She next became truly unconscious for 15 minutes, and she then recovered but had severe headache which spread from the mastoids over the occipital region and lasted for 2 hours. Gowers regarded this syndrome as migraine.

The possibility of epilepsy in these cases must, of course, always be carefully investigated before it is justifiable to make a diagnosis of migraine.

Summary

A group of cases is described in which consciousness was impaired in the course of attacks of migraine.

All were adolescent girls whose prodromal symptoms suggested that the vasomotor disturbance mainly affected the territory of the basilar artery.

In such cases it is possible that transient ischæmia of the reticular formation in the brain-stem results in alteration of consciousness.

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URETHRAL CATHETER AS A CAUSE OF URINARY-TRACT INFECTION IN PREGNANCY AND PUERPERIUM

W. BRUMFITT
M.D. Lond., M.R.C.P.
CONSULTANT PATHOLOGIST

B. I. DAVIES,*
M.B. Lond.
REGISTRAR IN PATHOLOGY

E. AP I. ROSSER
M.B. Lond., F.R.C.O.G.
CONSULTANT OBSTETRICIAN

EDGWARE GENERAL HOSPITAL, EDGWARE, MIDDLESEX

THE part played by the urethral catheter in causing infections of the urinary tract has been much debated (for example, Beeson 1958, Prather and Sears 1959). Many workers have shown that the prolonged use of the indwelling catheter almost invariably leads to infection, although the incidence can be reduced by special techniques (Kass and Sossen 1959, Gillespie et al. 1960). In women significant bacteriuria has been found to follow simple (intermittent) catheterisation within one to five days in 2–4% of the patients catheterised (Marple 1941, Kass 1956, Beeson 1958). Guze and Beeson (1956) showed that the passage of the urethral catheter introduced bacteria into the bladder, and the use of this instrument is held to be an important factor in the high incidence of urinary-tract infections in pregnancy (Dock and Guze 1959).

The susceptibility of pregnant women to urinary-tract infection is well known. For example, Kass (1956, 1957) found that 8–10% of pregnant women developed significant bacteriuria, and if these patients were left untreated 40% developed symptoms of urinary-tract infections.

In order to investigate the relationship of catheterisation to urinary-tract infections in pregnancy, advantage was taken of the fact that, at this hospital, maternity patients are not subjected to routine catheterisation, the procedure being carried out only when warranted by the clinical circumstances. For the purposes of this investigation, a group of patients was catheterised before delivery purely for the purpose of emptying the bladder and to obtain a specimen of urine for laboratory examination. We felt justified in this procedure since catheterisation is carried out routinely before delivery in many maternity departments. The incidence of infection in these patients was compared with that in a similar group of patients who were not catheterised. Finally, the incidence of infection was determined in patients in whom an obstetrical indication necessitated catheterisation.

Comparison of these results has enabled us to calculate the incidence of infection in normal labour without catheterisation, in normal labour with a single catheterisation, and in complicated labour with single or multiple catheterisation.

The Patients and Scheme of Investigation

The patients studied were derived from those admitted to a ward of the maternity department. A single ward was used for the investigation to enable the catheterisation technique and collection of mid-stream samples of urine to be standardised; whilst, at the same time, this simplified the organisation of the investigation.

* Present address: Department of Bacteriology, University of Edinburgh.

Altogether 320 patients were included in the series and were divided into three groups:

Group I.—Patients who were not catheterised during their stay in hospital.

Group II.—Patients who would not be catheterised under normal circumstances, but who were catheterised once in order to compare the incidence of infection in the normal subject and in group I.

Group III.—Patients in whom catheterisation was indicated clinically. The need for this was decided by the obstetrician-in-charge, the most common indications being retention of urine and preparation for obstetrical manœuvres such as the application of forceps.

The comparability of the three groups is shown in table I. Groups I and II are very similar, but the average age of group III is lower and it contains a higher proportion of primigravidæ.

Significant, but asymptomatic, bacteriuria has been found in 17% of unselected ward patients (Kaitz and Williams 1960), and urinary-tract infection is known to be more prevalent in maternity patients approaching term than in the ordinary population (Dodds 1931, MacLeod 1945, Kass 1956, 1957). A mid-stream specimen of urine was therefore collected at the time of admission, and, by ensuring that this specimen was free of abnormality, the danger of including in the investigation patients who already had asymptomatic infections was avoided. Absence of a previous history of urinary-tract infection or of an organic lesion of the urinary tract was considered essential, in order to avoid the inclusion of any patient with an unduly high susceptibility to infection.

TABLE I—COMPARABILITY OF THE GROUPS

Group	No. of patients	Average age (yr.)	Average no. of previous pregnancies	No. of primigravidæ
I (not catheterised) ..	105 *	25·7	1·7	35 (*33·3%*)
II (catheterised control group)	110	26·0	1·8	33 (*30·0%*)
III (catheterisation required)	105	23·8	1·2	46 (*44·0%*)

To show that the catheter caused the infection it was necessary to be sure that the urine was sterile at the time of catheterisation. This was achieved by saving the catheter specimen for laboratory examination and demonstrating its sterility.

In all three groups, mid-stream specimens were collected every two or three days while the patients remained in hospital, and always on the day of discharge. A further specimen was collected when the patients attended the postnatal clinic four to six weeks later. Note was made of any symptom which suggested urinary-tract infection, and laboratory investigations were carried out immediately.

If, for any reason, the number of specimens was inadequate for a proper assessment, the patient was omitted from the series.

Methods

Mid-stream specimens of urine were collected with the patient lying on a bed or couch with a bedpan placed under the buttocks. The vulva was cleansed by swabbing with an antiseptic (0·5% cetrimide with 0·05% chlorhexidine in aqueous solution) and micturition then commenced. In the middle of urination a sterile kidney-dish was used to catch approximately 30 ml. of urine, and was then withdrawn; the patient was allowed to continue passing urine into the bedpan. The urine which had been collected in the kidney-dish was then poured into a sterile universal container.

Catheter specimens of urine were collected only by qualified nurses or by the medical staff in attendance. Again the vulva was cleansed with the antiseptic solution and an aseptic field was obtained with sterile dressing towels. The operator's hands were washed and sterile gowns and gloves worn. A sterile soft rubber Jacques catheter (no. 6 size) was lubricated with sterile jelly and passed gently through the urethra into the bladder. Urine was collected into a sterile universal container. To ensure adequate illumination, movable 'Anglepoise' lamps were available.

Laboratory Methods

Specimens of urine were sent to the laboratory immediately after collection and were examined at once or stored at 4°C. Quantitative bacterial and cell counts were performed on the uncentrifuged urine samples, the cells being counted in a Fuchs-Rosenthal counting-chamber using a fluid which stained the red and white cells differentially. Bacteria were enumerated using a simple tenfold dilution technique followed by flooding 0·1 ml. volumes of each dilution on to well-dried nutrient-agar plates. Approximately 7 ml. of the remaining urine was then centrifuged at 1500 r.p.m. for seven minutes. The supernatant was tested for protein and the deposit examined microscopically as well as being cultured at 37°C on blood-agar and MacConkey plates. Any bacterial growth was identified and the antibiotic sensitivity determined. Bacterial counts of over 100,000 per ml. were taken to indicate active infection and multiplication in the urine (Kass 1956, Merritt and Sanford 1958). This was the sole criterion of infection used in the investigation. Counts of less than 2000 per ml. were taken to indicate contamination, and, on the few occasions when intermediate counts of doubtful significance were found, the examination was repeated. Cell-counts of over 50 leucocytes per c.mm. were regarded as abnormal, although they were not always accompanied by high bacterial counts.

Results

The findings are summarised in table II. (Of the uncatheterised control patients (group I), 4·7% developed infections, but in a similar group of patients who were catheterised once (group II) the incidence of infection was 9·1%. By contrast, in the remaining group of patients (group III) catheterisation, which was necessary on clinical grounds, resulted in a much higher incidence of infection (22·8%).

Apart from urinary-tract infection, a number of patients developed pyuria which was unaccompanied by significant bacteriuria. The incidence of this "sterile pyuria" was similar in all three groups but was highest in the uncatheterised patients (table II). Very high cell-counts were recorded in some of these urine specimens, the maximum being 5340 neutrophils per c.mm. with a complete absence of bacteria. Examination of these patients for *Mycobacterium tuberculosis* was negative, and no cause was found for the pyuria. In most cases it had disappeared by the day of discharge, and in only 2 patients was it still present on attendance at the postnatal clinic.

TABLE II—COMPARISON OF THE INCIDENCE OF INFECTION AND OCCURRENCE OF STERILE PYURIA IN THE THREE GROUPS

Group	Total	Infected	Sterile pyuria without bacteriuria
I	105	5 (*4·7%*)	12 (*11·4%*)
II	110	10 (*9·1%*)	9 (*8·2%*)
III	105	24 (*22·8%*)	9 (*8·6%*)

The cases in group III were analysed in an attempt to discover the factors which predisposed these patients to infection, and the findings are shown in table III. It is obvious that in these patients the clinical condition demanding catheterisation has an important bearing on the risk of subsequent infection. Catheterisation before obstetrical operations such as the application of forceps,

TABLE III—ANALYSIS OF INCIDENCE OF INFECTION IN GROUP III ACCORDING TO THE REASON FOR CATHETERISATION

Reason for catheterisation	Total no. of patients	No. of patients infected
Prior to obstetrical manœuvre ..	62	7 (*11·3%*)
Retention of urine	32	13 (*40·6%*)
Investigation of puerperal pyrexia ..	11	4 (*36·4%*)

TABLE IV—ORGANISMS RESPONSIBLE FOR THE INFECTIONS IN 39 PATIENTS

Organisms	No. of infections
Escherichia spp.	33 (84·6%)
Proteus spp.	4
Streptococcus fæcalis	3

1 patient was infected by *Esch. coli* and *Strep. fæcalis* together.

TABLE V—SYMPTOMS ASSOCIATED WITH URINARY-TRACT INFECTION IN 39 PATIENTS

Symptoms	No.
None	19 (48·6%)
Fever (over 99°F)	16 (41·0%)
Retention of urine	3
Stinging on micturition	3
Loin pain and rigors	2

breech extraction, or caesarean section might be expected to result in an increased incidence of infection because of the possible trauma associated with some of these procedures. Surprisingly, this was not so, and only 7 (11·3%) out of 62 patients subjected to these obstetrical manœuvres became infected. On the other hand, of the 32 patients catheterised to relieve retention of urine, 13 (40·6%) became infected, although the urine was sterile at the time of catheterisation. The few patients catheterised in the investigation of puerperal pyrexia appeared to develop subsequent infection readily.

The majority of the infections (84·6%) were found to be due either to *Escherichia coli* or to closely related organisms (table IV).

Table V lists the symptoms of patients who had urinary bacterial counts indicating infection. 2 patients developed high fever, rigors, and loin pain and were regarded as having acute pyelonephritis. However, specific urinary-tract symptoms were unusual, the majority of the patients being either asymptomatic or febrile without localising symptoms.

Discussion

This study was planned to investigate the risk of catheterisation in pregnant women when that procedure was carried out during labour or in the early puerperium. It was found that, when catheterisation was carried out purely to obtain a specimen of urine in women with uncomplicated labour, the incidence of infection was 9·1%, whereas in a similar group of women not subjected to catheterisation infection resulted in only 4·7% (table II). Thus, although catheterisation was carried out aseptically and by qualified staff, an increase in the incidence of infection resulted (table II) although this increase does not reach the conventional level of statistical significance ($\chi^2 = 1{\cdot}51$, $P = 0{\cdot}2$–$0{\cdot}3$).

In the 105 patients who required catheterisation because of some complication the incidence of infection was 22·8%, which statistically is highly significant ($\chi^2 = 12{\cdot}6$, $P < 0{\cdot}001$). This shows that it is not only catheterisation which increases the danger of infection but also the association with abnormality in the catheterised patient. Further analysis of this group of patients (table III) shows that it is not the surgical procedures, such as the application of forceps, which carry a high risk of infection, but catheterisation for other complications such as retention of urine or for the investigation of puerperal pyrexia.

Dilatation of the ureters during pregnancy is said to increase the susceptibility to infection (Leary and Peters 1943, Beeson 1955), and the atony and distension of the bladder which accompany retention of urine may play a similar role. No explanation was found for the subsequent development of infection in 4 of the 11 patients investigated on account of puerperal pyrexia.

Our criterion of infection was the finding of over 100,000 bacteria per ml. of urine. This bacteriuria was usually, but not always, accompanied by pyuria. On the other hand pyuria without bacteriuria was quite common, being of approximately equal frequency in all the three groups of patients studied (table II). The cause of this pyuria was not discovered, and examination for tuberculosis was always negative. The pyuria usually disappeared spontaneously before the patient left hospital. Kass (1955) and Merritt and Sanford (1958) have pointed to the value of quantitative bacterial counts, and our own experience supports their view that quantitative counts carried out on properly taken mid-stream specimens of urine clearly distinguish between contamination of the specimen and true urinary infection.

Specific urinary-tract symptoms were absent in 31 patients where urinary bacterial counts showed unequivocal evidence of infection. Many patients (48·6%) were entirely symptom-free, and in most of the remainder fever was the sole finding. Only 8 out of the 39 patients (20·5%) had symptoms which pointed to the urinary tract. The importance of asymptomatic infections in pregnancy has been emphasised previously (Kass 1956, 1957, 1959).

The majority of the infections were due to organisms of the *Esch. coli* species, which is the usual finding in primary urinary-tract infections (Coleman and Taylor 1949, Garrod et al. 1954). Good response to chemotherapy was observed, and when urine examination was repeated at the postnatal clinic no case had relapsed.

Summary

The incidence of urinary-tract infection was studied in three groups of maternity patients.

In the first group (105 patients), where uneventful normal labour had not necessitated catheterisation, infection of the urinary tract occurred in 4·7%. A further 110 patients, also with uncomplicated labour, were each catheterised once, solely to obtain a specimen for laboratory examination; and in this group the infection-rate was 9·1%. In the third group (105 patients), who all had complicated or difficult labours and on whom catheterisation had had to be carried out for obstetrical reasons, the infection-rate was 22·8%. Detailed analysis of this group showed that catheterisation for certain reasons, such as retention of urine during delivery or in the puerperium, was especially liable to be followed by infection (40·6%). On the other hand, the risk was much smaller when the catheter was used before obstetrical procedures, such as the application of forceps (11·3%).

Many patients found to have urinary-tract infections were completely free of symptoms or had only mild puerperal pyrexia. The classical symptoms of infection of the urinary tract were found in only 8 of the 39 cases. Therefore, in many patients, the urinary-tract infection could be detected only by laboratory examination of the urine. The finding of more than 100,000 organisms per ml. of fresh uncentrifuged urine was taken as evidence of active infection with multiplication of bacteria in the bladder. The majority (84·6%) of the infections were caused by organisms of the *Esch. coli* species.

It is concluded that catheterisation is unjustified as a means of obtaining urine for laboratory examination, since adequate information can be obtained from quantitative bacterial studies on properly taken mid-stream

specimens of urine. Where catheterisation is unavoidable, subsequent examination of the urine is important for the early recognition and treatment of infection.

We are most grateful to Sister A. Crowther, S.R.N., S.C.M., for the efficient way in which she organised the collection and delivery of urine specimens.

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BACILLURIA IN PREGNANCY

GRACE C. TURNER
M.B. Aberd.
LECTURER IN BACTERIOLOGY, UNIVERSITY OF ABERDEEN

THERE is increasing evidence that severe renal damage may be initiated by apparently trivial or even unrecognised infections of the urinary tract. In pregnancy, urinary-tract infections seem to be isolated episodes, and, as they apparently respond rapidly to treatment, their evolution receives less attention than it deserves. Recent work by Kass (1960b) on bacilluria in pregnancy suggests that it may be possible to select, before symptoms develop, some of the women who are especially likely to develop pyelitis, and it was thought desirable to test this claim.

According to Kass (1955), bacilluria is significant if 100,000 organisms are present in 1 ml. of an uncentrifuged mid-stream specimen of urine. He considers mid-stream samples adequate for this type of investigation, thus dispensing with the potentially dangerous catheter (Kass 1957). Crude bacterial counts can distinguish significant bacilluria from contamination, and this has been confirmed by many workers (Boshell and Sandford 1958, Monzon et al. 1958, Slade and Linton 1960). Using this method it was decided to find out how the local incidence of asymptomatic bacilluria compared with Kass's claim that it occurs in 6–7% of pregnant women. Patients with asymptomatic bacilluria were then watched throughout pregnancy to find out whether, as Kass (1960b) found, 40% develop a urinary-tract infection.

Material and Methods

The patients were an unselected sample of all women attending the main antenatal clinic in the city of Aberdeen. At their first visit a nurse washed the vulva with a liquid soap and water and told them how to collect a mid-stream sample of urine into a sterile wide-mouthed jar.

The specimens were brought to the laboratory within three hours, and a standard 0·01 ml. drop of uncentrifuged urine delivered from a suitable drawn sterile pipette was inoculated on a blood-agar plate and a MacConkey plate. A gram-stained film was made from a similar volume.

The culture results were read after overnight incubation at 37°C. A count of 1000 or more colonies constituted significant bacilluria—i.e., the equivalent of 100,000 organisms per ml. of uncentrifuged urine. 15 (1%) of 1500 urines had counts ranging from 10,000 to 100,000 per ml. and were classified as doubtful. Contaminated urines had counts of considerably less than 10,000 per ml. In general, a direct gram film of the uncentrifuged urine confirmed the culture findings, 85% of the positives showing very numerous organisms.

TABLE I—SIGNIFICANT BACILLURIA IN 1500 ANTENATAL PATIENTS

Group	Total no.	Result		
		Positive	Negative	Doubtful
Primiparæ ..	557 (37%)	37 (7%)	516 (92%)	4 (1%)
Multiparæ ..	943 (63%)	71 (8%)	861 (91%)	11 (1%)
All	1500 (100%)	108 (7%)	1377 (92%)	15 (1%)

Results

Table I shows that of 1500 antenatal patients 108 (7%) had significant bacilluria. Of 557 primigravidæ 37 (7%) were positive, and of 943 multiparæ 71 (8%) were positive.

The overall figure confirms Kass's (1960a) claim, but he found almost twice as many positives among multiparæ as among primigravidæ. Of the 108 positives, 45 showed significant numbers of pus cells, taking 3 pus cells per oil-immersion field as the lower level of significance. Protein was present in over 80% of the urines containing pus cells. All patients with significant bacilluria were re-examined at the next antenatal visit, and each was matched for age and parity with a control negative. This was necessary in order to relate bacilluria to the subsequent development of clinical infection. Repeat examinations almost always confirmed the initial findings.

Influence of Age and Parity on Incidence of Bacilluria

Since there was apparently little difference between the incidence of bacilluria in primigravidæ and multiparæ, it was thought that the age of patients might affect the incidence. Table II shows no such effect.

TABLE II—BACILLURIA RELATED TO PATIENTS' AGE

Age (yr.)	Primigravidæ		Multiparæ	
	Total no.	No. positive	Total no.	No. positive
16–29	504	33 (6·5%)	622	46 (7·9%)
30–44	53	4 (7·6%)	321	25 (6·8%)

Table III, although the numbers are very small, suggests that the incidence of bacilluria is appreciably raised in women in the higher-parity groups.

Effect of Preparation on Contamination of Specimens

It is now generally accepted that mid-stream specimens give comparable results to catheter specimens. This greatly simplifies the collection of urines on a large scale, and the question arose whether the procedure could be further simplified by omitting the preliminary washing of the vulva, which is very unpopular with both patients and nursing staff.

Table IV shows the bacteriological findings in urines from 200 patients who were prepared in the recognised manner and in 200 urines collected from patients who were not prepared. Contamination is not significantly less in specimens from prepared patients. It has been suggested that mid-stream specimens of urine from prepared patients remain sterile at room temperature longer than those from patients who have not been prepared. 400 sterile urines—

TABLE III—BACILLURIA RELATED TO PARITY

No. of previous pregnancies	Total no. of women	No. of women with bacilluria
0	557	37 (6·6%)
1	469	27 (5·8%)
2	257	23 (8·9%)
3	117	9 (7·7%)
4	59	7 (11·9%)
5 and over	41	5 (12·2%)

200 collected after preparation, and 200 collected without preparation—were left at room temperature and sub-cultured after three hours and six hours. After three hours all 400 were sterile, but after six hours only 59 of the former and 60 of the latter were sterile. This shows that at least for the first six hours the degree of contamination is the same in both types of specimens. It is essential to examine all specimens within three hours of collection, and this has always been the routine procedure in this investigation. It appears that, where antenatal patients are concerned, cleansing of the vulva is not worthwhile. It has now been dispensed with, in the collection of our routine specimens.

Types of Bacteria Causing Bacilluria

While *Escherichia coli* is the commonest organism found in acute and chronic symptomatic urinary infections, proteus, *Pseudomonas pyocyanea*, *Streptococcus fæcalis*, *Staphylococcus aureus* and *Aerobacter aerogenes* are also frequently isolated. Moreover in chronic cases the infection is often mixed. Table v shows that the picture in asymptomatic bacilluria is different.

TABLE IV—EFFECT OF PREPARATION OF PATIENTS ON CONTAMINATION-RATE

Samples of urine	Following preparation	Without preparation
No. positive	14	16
Sterile	154	144
Contaminated	32	40
Total	200	200

Esch. coli here means an organism giving the usual fermentation reactions of a fæcal coliform. In over 90% of cases only one type of organism was present, and it is striking how the *Esch. coli* strains predominate. Judging solely by sugar reactions these *Esch. coli* strains seem to fall into four main subgroups.

Only 79 of the 108 patients with bacilluria have so far been delivered. However, of these 79, 49 or over 60% developed urinary-tract symptoms of one kind or another subsequent to the detection of bacilluria (table VI). The symptoms included frequency, nocturia, dysuria, hæmaturia, loin pain, fever, nausea, and vomiting. Frequency alone, in the absence of other symptoms, cannot be regarded as significant as this symptom is common in pregnancy in the absence of urinary infection. The figures in table VI are small but they do suggest some relation between asymptomatic bacilluria and subsequent clinical urinary infection. Indeed, if the remainder of our cases confirm these findings, it seems that the method will make it possible to identify those likely to develop urinary-tract infection.

TABLE V—ORGANISMS CAUSING BACILLURIA IN 108 ANTENATAL PATIENTS

Type	No.
Esch. coli	95 (87·9%)
Esch. coli and *Strep. fæcalis*	4 (3·7%)
Proteus	5 (4·6%)
Staph. aureus	1 (1·0%)
Staph. albus	3 (2·8%)

Griess-Ilosvay Nitrite Test and Bacilluria

This test (Griess 1879, Ilosvay 1889), which depends on the fact that the organisms causing bacilluria, with the exception of *Strep. fæcalis*, break down nitrate in the urine to nitrite, was reviewed recently by Smith et al. (1961). It has been used in conjunction with the other bacteriological tests in this investigation and is a useful aid to the laboratory diagnosis of bacilluria. The reagents used are:

TABLE VI—RELATION OF BACILLURIA TO SUBSEQUENT CLINICAL INFECTION

Bacilluria	No. delivered	No. developing symptoms
Positive	79*	49
Control negative	64	1

* Only 79 of the 108 patients with bacilluria have so far completed pregnancy.

Solution A.—0.5 g. sulphanilic acid in 150 ml 5% acetic acid.
Solution B.—0·1 g. α-naphthylamine in 150 ml. 5% acetic acid.

By the process of diazotisation the addition of 1 ml. of each of the above solutions to 2 ml. of a urine containing nitrite results in the production of a red water-soluble azo dye (Feigl 1960).

A positive nitrite test is consistent with significant bacilluria. No false positives have yet been found. On the other hand 20% of significantly infected urines give a negative result. These can be divided into two groups:

(1) Those urines which have not yet become positive. A bacterial count of at least 10^6 per ml. is necessary for a positive result, and therefore those urines with a lower count are negative.

(2) Those urines which have been positive but have reverted to negative. In urines with a very high count, the nitrite is itself quickly broken down—a process which can take place at room temperature within one to two hours. Such specimens are positive if examined immediately after collection. Occasionally in a urine with an exceptionally high count, the nitrite may be broken down in the bladder as the urine is negative when passed. It is unfortunate that this test is not positive in all cases of bacilluria, but its use might be considered in those clinics where routine cultures cannot be carried out.

Discussion

The results of this investigation of 1500 antenatal patients confirm Kass's claim that asymptomatic bacilluria occurs in about 7% of women in pregnancy. Although the incidence of bacilluria does not seem to be affected by the age of the patient, it appears to increase with increasing parity. This might be a cumulative effect, the bacilluria persisting from one pregnancy to another. In those patients so far followed up who did not develop clinical symptoms, and who therefore remained untreated, the bacilluria continued throughout pregnancy and was still present two months after delivery. Our patients were investigated at their first antenatal visit, and since this was most commonly in the middle trimester we are not able to say at what stage of pregnancy the bacilluria first appears. Kass (1960b) claims that it is present by the second month, and in some of our cases this was found to be so. An investigation of 200 young unmarried women, including nursing, technical, and clerical staff, showed that only 1% had bacilluria—which contrasts sharply with the 7% found in antenatal patients. It appears, therefore, that pregnancy, or perhaps marriage, is the factor which determines the onset of bacilluria. A survey, now in progress, of patients attending infertility clinics may help to throw light on this point.

The significance of asymptomatic bacilluria in pregnancy is still not clear, but our preliminary findings suggest that there is an association between this condition and subsequent clinical urinary infection. Of 79 positive patients who have so far completed pregnancy, over 60% developed a urinary-tract infection, whereas of 64 control patients, matched for age and parity but without bacilluria, only 1 developed symptoms.

This does not prove casual relationship but it is suggestive, and possibly treatment of the bacilluria might prevent

some of the overt infections. Treatment of asymptomatic bacilluria has not been studied in detail; but, in a preliminary trial, 8 patients were treated with 'Madribon' (2, 4-dimethoxy-6-sulphanilamido, 1, 3-diazine) immediately bacilluria was detected. A bacteriological cure was obtained in 6 of the patients within one week, and the 2 resistant cases responded to nitrofurantoin within forty-eight hours. Both drugs were given for four weeks and then withdrawn. Weekly specimens of urine from all 8 patients have been examined, and there were no relapses during pregnancy; however 1 patient again had bacilluria six weeks after delivery. If these preliminary results can be confirmed in a larger and adequately controlled series of cases, it may be possible to substantiate Kass's (1960b) claim that the elimination of bacilluria significantly reduces the incidence of urinary-tract infections in pregnancy.

It is noteworthy that most of the organisms causing asymptomatic bacilluria belong to the *Esch. coli* group, only 10% of patients excreting other types of organisms. This is very different from the findings in an unselected group of patients with urinary-tract infections where organisms such as proteus, *Strep. fæcalis*, *Staph. aureus*, and *Ps. pyocyanea* are also common pathogens. Whether the preponderance of *Esch. coli* is related to the age or physiological state of the patient or to the mode of infection is not clear. The various routes by which bacteria may reach the urinary tract have been reviewed recently by Straffon (1961), and such evidence as we have favours the ascending route of infection. We have also been interested in the concept of a continuous flow culture in the bladder. *Esch. coli* appears to live in the urinary tract of some antenatal patients as a harmless intruder, for bacilluria may persist for months without any apparent evidence of invasion. Kass (1960b) claimed that bacilluria in pregnancy leads to premature birth of the baby. Of 79 positive patients delivered, 4 had premature infants—a rate which is not unduly high.

These results suggest that there may be a case for making examination for bacilluria part of routine antenatal care. If it can be shown that the elimination of bacilluria is possible and that this prevents a proportion of cases of pyelitis then the case is good. Possibly the potential long-term effects of urinary-tract infections in pregnancy—in particular chronic pyelonephritis and perhaps hypertension—are even more important reasons for instituting such care. We do not underestimate the difficulties of carrying out such bacteriological investigations; but if mid-stream specimens of urine can give valid answers without special preparation of the patient, then examination should not be too difficult. Pryles et al. (1961) found that preparation was essential before the collection of mid-stream specimens from children, but we believe that this is not necessary in antenatal patients. The culturing of urines in the clinic immediately after collection is a simple procedure which could be carried out by a technician. Specimens could be collected in a stainless-steel sputum mug, which is easily re-sterilised. Where bacteriological facilities are not available the Griess-Ilosvay nitrite test is an alternative but less satisfactory method of diagnosis.

Summary and Conclusions

Of 1500 antenatal patients 7% had asymptomatic bacilluria, which was caused in most cases by *Escherichia coli*.

Of 108 women found to have asymptomatic bacilluria, 79 have so far been delivered; and, of these, 49 developed clinical symptoms of urinary infection.

Mid-stream specimens are adequate for the detection of bacilluria. Patients do not require special preparation. The urines should be bacteriologically examined within three hours of collection. It is suggested that bacteriological examination of the urine should be included in routine antenatal care.

I wish to thank members of the staff of the department of midwifery for advice and permission to study their patients, my colleagues in the department of bacteriology for help and encouragement, and the nursing staff of Castle Terrace antenatal clinic for their forbearance.

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A CASE OF XXXXY KLINEFELTER'S SYNDROME

JEAN H. FRASER
M.B. Glasg.
REGISTRAR

ELIZABETH BOYD
B.Sc. Glasg.
RESEARCH ASSISTANT

BERNARD LENNOX
M.D. Durh., Ph.D. Lond., M.R.C.P., F.R.F.P.S.G.
SENIOR LECTURER

PATHOLOGY DEPARTMENT, WESTERN INFIRMARY, GLASGOW

W. M. DENNISON
M.D. Glasg., F.R.C.S.E., F.R.F.P.S.G.
CONSULTANT SURGEON, ROYAL HOSPITAL FOR SICK CHILDREN, GLASGOW

FIVE chromosomal variants of chromatin-positive Klinefelter's syndrome are known. In addition to the common XXY form first demonstrated by Jacobs and Strong in 1959, the following variants have been described: XXXY (Ferguson-Smith et al. 1960, Carr et al. 1961); XXYY (Muldal and Ockey 1960, Carr et al. 1961); the mosaic XXY/XY (Ford et al. 1959, Crooke and Hayward 1960); and XXXXY (Fraccaro et al. 1960a, b, Anders et al. 1960, Miller et al. 1961). We here report a fourth case of the last variant, which, it begins to appear, has some claims to be regarded as a distinct syndrome.

Fig. 1—External genitalia showing hypoplastic scrotum and normal penis.

Case-record

The patient, $8\frac{1}{2}$ years of age, was admitted to hospital for interval appendicectomy. He is the oldest of a sibship of 3. At the time of conception the mother was 22 and the father 24 years of age. No significant findings arise in the family history. (It was unfortunately not possible to examine any other members of the family.)

The child is 107 cm. in height and is small for his age. Apart from the genitalia the external appearance is unexceptional. The penis is

Fig. 2—X-ray of forearms and elbow-joints, showing deformities of proximal radius and ulna and on the left a synostosis.

normal, but the scrotum is underdeveloped and the testes are undescended (fig. 1). There is a severe degree of mental deficiency. On the Merril-Palmer scale, the mental age is 2 years 8 months and the child is ineducable. Speech is very indistinct, but this is partly accounted for by a cleft palate, which was repaired at the age of 3 years.

INVESTIGATIONS

X-ray

All the bones are small but the centres of ossification are within normal limits for the age. There are multiple bony abnormalities. The sella turcica is enlarged and deep. There is bilateral coxa valga. The proximal parts of both ulnæ are expanded. The radius on both sides is elongated proximally and there is a radio-ulnar synostosis on the left side (fig. 2). In each hand, there is an abnormal centre of ossification at the base of the 2nd and 5th metacarpals. The middle phalanges of the little fingers contain two almost equal centres of ossification, and the terminal phalanx in each little finger is curved (fig. 3).

Fig. 3—X-ray of right hand, showing abnormal proximal epiphyses in the 2nd and 5th metacarpals, and defects of the 5th finger.

Testicular Lesion

At laparotomy, both testes were found in the pelvis near the internal inguinal ring. The vas deferens and epididymis appeared normally developed on both sides. Histological examination of a biopsy specimen of the right testis shows that the tubules are very scanty and contain no recognisable germ cells (fig. 4). The epididymis is infantile with tubules widely separated.

Sex Chromatin

The first buccal smears examined, stained with cresyl echt violet and apparently of good quality, showed approximately 90% of negative nuclei; but of the positive nuclei a third had two sex-chromatin bodies and a few had three (fig. 5). This raised a strong suspicion of the presence of a mosaic, but later smears, carried out over a period of several weeks, showed great variation in the number of negative nuclei, though the proportion of the positive nuclei that contained two and three bodies remained roughly constant. In the preparation with the highest proportion of positive cells, the count was: 3 bodies, 9·5%; 2 bodies, 30%; 1 body, 36%; no body, 24·5%. The child had not received cortisone at any time.

Chromosome Analysis

Mitotic chromosome counts were made on cultured peripheral blood by the method of Moorhead et al. (1960). Over 90% of the 46 cells counted contained 49 chromosomes—2 had 47, 2 had 48, and 1 was tetraploid. Detailed analysis shows that there are 22 pairs of autosomes together with a Y chromosome and 3 extra chromosomes which lie in the medium-size range. On the basis of the sex-chromatin findings, these are presumed to be X chromosomes, and the sex-chromosome constitution appears to be XXXXY.

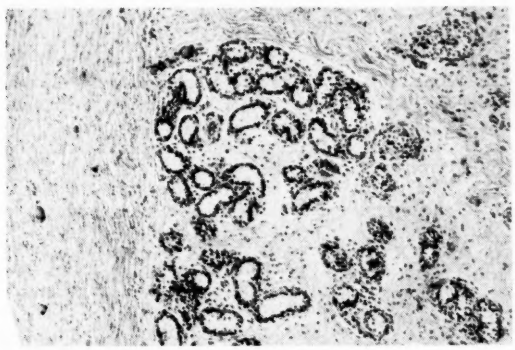

Fig. 4—Section of testicular biopsy specimen showing scanty tubules without germ cells. (Hæmalum and eosin ×60.)

Tissue cultures were taken from abdominal skin, rectus sheath, appendicular peritoneum, testis, and epididymis at the time of laparotomy. Excellent preparations were obtained by Dr. D. G. Harnden from testis and skin, and a few countable cells were obtained from rectus sheath and epididymis. The results again indicate an unmixed XXXXY constitution.

Discussion

Buccal Smear Findings as Evidence of Mosaicism

The finding of a very low count of chromatin-positive cells in the first buccal smear, with 2-bodied or 3-bodied cells among those which were positive, raised originally a strong suspicion of mosaicism: at their face value the figures might appear to be best explained by the presence of a mixture of perhaps 85% of single-X cells with

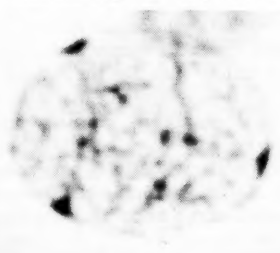

Fig. 5—Nucleus of an oral mucosal cell showing 3 sex-chromatin bodies. (Cresyl echt violet ×3500.)

15% of four-X cells. Later smears with fewer chromatin-negative cells made this seem less probable, and the chromosomal analyses make it very improbable, though of course mosaicism of tissues which were not examined cannot be eliminated. The highest proportion of chromatin-positive cells we obtained in any preparation in this case was 75·5%—not much higher than the 65–75% range of our XXX cases (Fraser et al. 1960). Though the buccal smear is qualitatively a very reliable indicator, the proportion of positive and negative cells in single smears can be very misleading, and apparent anomalies should not be relied upon as evidence of mosaicism unless they are constant on repeated examinations. The recent evidence of variations produced by cortisone (Taylor 1961) is further evidence in this direction.

Origin of the Chromosomal Anomaly

The XXXXY complex can be produced only if non-disjunction occurs during more than 1 cell division. Several hypotheses can be suggested:

1. An XXY fertilised egg is produced by the accepted process of non-disjunction in one or other parent. The two X chromosomes of the XXY zygote then undergo mitotic non-disjunction in the first cleavage division, and one of the two resulting cells contains the Y chromosome only, the other the whole XXXXY complex. The Y cell is non-viable and is eliminated, leaving the XXXXY cell to develop.

2. Non-disjunction in both first and second meiotic divisions during gametogenesis in the mother might result in an XXXX ovum which would then be fertilised by a Y sperm.

3. If one assumes that meiotic non-disjunction occurred in both parents, several possibilities arise. But since XX+XY gives only XXXY, one must assume that double non-disjunction occurred in one or other parent to produce an XXX ovum or an XXY sperm. Hypothesis (2) is therefore to be preferred as simpler.

4. If one assumes that one or other parent is already abnormal, there are yet further possibilities. An abnormal father is highly improbable, for XXY Klinefelter's syndrome has never yet been shown to be fertile, and could not in any case produce an XXXXY zygote by a single non-disjunction. An abnormal XXX mother—who could be fertile—is more likely: it is not hard to imagine such a woman producing an XXXX ovum. Though this is a very plausible hypothesis, the children reported or known to us to have been born to XXX mothers so far have all been normal. Also, in this case the mother is known not to have been mentally defective, and at least the great majority of XXX cases so far described have been mentally defective.

We prefer the first two hypotheses but can make no choice between them.

Is there an XXXXY Syndrome?

This is a problem of more general interest than might appear at first sight. It is difficult to sort out among the clinical descriptions of the various syndromes associated with chromosomal anomalies, especially those associated with an extra chromosome, just how much of the anomaly is a non-specific quantitative one—something that might be seen with an unbalanced excess of chromosomal material of any kind in the nucleus—and how much is specifically associated with the excess of one particular chromosome. Because the X chromosome can occur at several levels of excess, there is more hope of doing this for this chromosome than for any other.

The reported cases of XXXY and XXYY Klinefelter's syndrome have all been mentally defective, but they do not appear to differ in any other respect significantly from the common XXY form (Barr et al.'s case 3 had, remarkably enough, a testicular biopsy more nearly normal than any we have seen in any case in this group).

Including the present case and that of Anders et al. (which may be a mosaic but has XXXXY cells as its main component) four cases are available. They, or some of them, have the following points in common:

(*a*) Severe mental defect. This, however, is the common factor of all major chromosome defects (except XO) and seems to be entirely non-specific (though there may of course be underlying lesions which are more specific).

(*b*) Skeletal deformities. The deformities of the radius and ulna in Anders et al.'s case and our own, with proximal enlargement and synostoses, seem almost identical, and both have supernumerary epiphyses in the wrist and hand. Miller et al.'s case (about which Dr. Miller has been good enough to give us some additional details) shows similar though rather less distinct changes. In Fraccaro et al.'s case, only absence of some epiphyses in the same area is noted. In the rest of the skeleton, apart from osteoporosis and coxa valga, there are various minor deformities in the four cases complying to no general pattern.

(*c*) Strabismus is present in Miller et al.'s and Anders et al.'s cases.

Genital Changes

Of eight testes in four cases only one (in Miller et al.'s case) is descended. Testicular biopsies were performed in three cases, and show a uniform picture of a small solid testis with gross loss of tubules and with no germ cells. Hormone studies in the fourth case—that of Miller et al., which is the only adult—suggest that the Leydig cell hyperplasia of XXY Klinefelter's syndrome is absent. Maldescent is probably no more common in XXY Klinefelter's syndrome than in the chromosomally normal, and neither this nor severe testicular atrophy seem to be characteristic of any other chromosomal lesion.

Conclusions

The conclusions that can be drawn from these comparisons are limited but not uninteresting. *Mental defect* emerges as the one condition apparently directly associated with a simple quantitative excess of chromosomes (it is absent in the only viable *deficiency* of chromosomes, XO Turner's syndrome). Congenital heart lesions are present in only one of our cases: they seem to be characteristic of the grosser chromosomal lesions, including Turner's syndrome; and the relationship, though possibly quantitative, must be quite different to that of mental defect (there are probably a number of other sporadic lesions, such as the cleft palate in our own case, which come into the same category).

The upper-extremity lesions may well be a specific characteristic of the XXXXY syndrome, and the testicular lesion almost certainly is. The latter is the more interesting. It is notable that the influence of the single Y continues to produce a testis: the four Xs can depress the testis, but it shows no trace of deviation towards an ovary or ovotestis; there is no feminisation. It is noteworthy, too, that whereas XXY produces a moderately abnormal testis, and XXXY a testis which (so far as one can gather from published descriptions) is very like that of XXY, XXXXY produces a much grosser defect. One would have expected the XXXY testis to be intermediate in histology. This suggests the interesting speculation that, so far as antagonising the gonad-inducing action of the Y is concerned, the X chromosomes may be effective only in pairs.

Summary

A mentally defective boy with XXXXY Klinefelter's syndrome is described. Comparison with the three previously reported cases indicates that bony lesions of the upper extremity are probably, and gross testicular atrophy with maldescent almost certainly, characteristic of this chromosomal constitution.

We are most grateful to Dr. D. G. Harnden for the tissue-culture studies in this case.

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5-HYDROXYTRYPTOPHAN-SECRETING BRONCHIAL CARCINOID TUMOUR

M. SANDLER
M.B. Manc., M.R.C.P.
CHEMICAL PATHOLOGIST,
QUEEN CHARLOTTE'S MATERNITY HOSPITAL, LONDON, W.6

PETER J. SCHEUER
M.B. Lond.
LECTURER IN MORBID ANATOMY,
ROYAL FREE HOSPITAL SCHOOL OF MEDICINE, LONDON, W.C.1

P. J. WATT
M.B. Lond.
HOUSE-PHYSICIAN, ROYAL FREE HOSPITAL*

THE carcinoid syndrome, although rare, has been well documented (Thorson 1958). Whilst earlier reports dealt in the main with tumours deriving from the argentaffin cells of the gastrointestinal tract, twenty-one published cases attest to the fact that the syndrome may also be associated with carcinoid tumours of bronchial origin (Anlyan et al. 1960, Bernheimer et al. 1960, Dockerty et al. 1958, Escovitz and Reingold 1961, Gerok and Müller 1960, 1961, Hüsselmann and Wendt 1961, Joseph and Taylor 1960, Krikler et al. 1958,† Luparello and McAllister 1961, Sauer et al. 1958 [3 cases], Schneckloth et al. 1959, Southren 1960, Stanford et al. 1958, Toomey and Felson, 1960, Warner and Southren 1958 [2 cases], Weiss and Ingram 1961, Williams and Azzopardi 1960 [2 cases]).

The syndrome has shed light on the action and metabolism of the 5-hydroxyindoles in man. Lembeck (1953) first detected 5-hydroxytryptamine (5-H.T.) in carcinoid tumour tissue, and his observation has since been repeatedly confirmed in similar tissue from affected patients. Most of these patients put out large amounts of 5-hydroxyindoleacetic acid (5-H.I.A.A.) as the main metabolic product of 5-H.T. in their urine. Sandler and Snow (1958), however, characterised a distinct clinical variant of the carcinoid syndrome in which large amounts of 5-H.T. and its precursor 5-hydroxytryptophan (5-H.T.P.), as well as 5-H.I.A.A., were excreted. They provided evidence that these atypical findings were the consequence of a tumour which was secreting 5-H.T.P., but it was not possible to test their hypothesis directly.

We describe here a case of bronchial carcinid tumour with atypical biochemical findings similar to those described by Sandler and Snow (1958). By detecting 5-H.T.P. in tumour tissue, we have been able to show that their hypothesis was correct.

Case-report

A 52-year-old housewife was first admitted to hospital in July, 1959, with abdominal pain, weight loss, and increasing pigmentation. For two years she had had repeated attacks of dull pain in the left hypochondrium, lasting three to four days and unaffected by posture or alkalis.

The patient was thin (weight 46 kg.) with gross pigmentation of skin but not of oral mucosa. The only other abnormal physical finding was a smooth liver enlarged to 3 cm. below the right costal margin.

Of many laboratory and radiological examinations performed at this time, the only abnormal findings were an erythrocyte-sedimentation rate (E.S.R.) of 43 mm. in the first hour (Wintrobe) and a glucose-tolerance test which showed a fasting blood-sugar level of 48 mg. per 100 ml. and $^1/_2$, 1, $1^1/_2$, and 2 hr. levels of 78, 84, 134, and 109 mg. per 100 ml. respectively. Chest X-ray showed no abnormality. Laparotomy revealed a smoothly enlarged liver, which on biopsy showed only chronic venous congestion. Postoperative course was uneventful.

In June, 1960, the patient was readmitted with a four-week history of passing 5–6 loose watery stools per day. The liver was now enlarged to the umbilicus, and severe ankle œdema had developed. The laboratory studies of the previous year were repeated and showed no essential change. A rounded opacity in the right mid-zone was now seen on chest X-ray. Another laparotomy was performed with similar findings to the first. Following operation deterioration was rapid.

In October, 1960, the patient was transferred to the Royal Free Hospital under the care of Professor Sherlock. The patient was now ill and emaciated (weight 39 kg.) with deep pigmentation, palmar erythema, and a sore red tongue. The liver was still further enlarged. Numerous dilated abdominal-wall veins with upward flow suggested block of the inferior vena cava. Ankle œdema and proteinuria were prominent. Other laboratory investigations included the following: hæmoglobin 10·7 g. per 100 ml.; E.S.R. 79 mm. in the first hour (Westergren); serum-bilirubin 1·5 mg. per 100 ml.; serum-alkaline-phosphatase 44 King-Armstrong units per 100 ml.; serum-glutamic-oxaloacetic-transaminase and isocitric-dehydrogenase levels within normal limits; serum-albumin 3·7 g. per 100 ml.; serum-globulin 3·9 g. per 100 ml.; stool occult-blood test positive.

Tomograms of the right lung revealed a solid lesion 2 cm. in diameter. X-rays of the pelvis and upper femora showed scattered œsteoblastic metastases. A percutaneous liver biopsy specimen was composed mainly of tumour cells considered to be carcinomatous. However, the finding of a urinary 5-hydroxyindoleaceticacid excretion of 81 mg. per 24 hr. enabled a diagnosis of carcinoid syndrome to be made.

A single intravenous dose of 10 μg. noradrenaline failed to provoke a carcinoid flush. However, 200 μg. noradrenaline given intravenously over 30 minutes produced pronounced flushing of the upper part of the body, without alteration in blood-pressure.

The subsequent course was progressively bad. There were repeated hæmatemeses from an undetermined anatomical site, and, in spite of blood-transfusions, the patient died 3 weeks after admission.

*Present address: Hammersmith Hospital, Ducane Road, London, W.12.
†The tentative diagnosis made in case 1 has since been confirmed at necropsy (D. M. Krikler, personal communication).

Necropsy

Necropsy was performed 24 hours after death. The body was wasted, moderate œdema of legs and sacrum was present, and there was generalised grey skin pigmentation. Both pleural cavities contained blood-tinged effusions. The lungs were œdematous, congested, and mildly emphysematous. Grey-white tumour-like nodules up to 0·3 cm. in diameter were scattered throughout the lung parenchyma, and a well-defined firm white mass 1·5 cm. across was seen immediately adjacent to the right lower lobe bronchus a few centimetres from its origin. This tumour did not encroach on the bronchial lumen, and the bronchial mucosa appeared intact. Moderate excess of clear yellow fluid was present in the pericardial sac but the heart was normal. The inferior vena cava was occluded by red thrombus which extended from the iliac veins to the level of the liver. The peritoneal cavity contained a moderate amount of clear yellow fluid. The stomach was distended by blood-clot, and an irregular ulcer was present near the cardia. No tumour was seen in small or large intestine or in the appendix. The liver was enlarged; its capsular surface was smooth. Several firm rounded grey-white tumours containing hæmorrhagic and necrotic areas, the largest 12 cm. in diameter, were seen on sectioning the organ. The remaining liver tissue was deeply congested. Three tumour nodules, the largest 2 cm. across, were present in the pancreas. The kidneys showed slight granularity of capsular surfaces, were pale yellow, and had pale, widened cortices. The right ovary bore a 4 cm. whorled fibrous tumour. Metastatic deposits were present in a few lymph-nodes of abdominal and thoracic groups. Each suprarenal gland contained a tumour nodule 1 cm. in diameter. Metastatic deposits up to 2 cm. in diameter were seen in cerebral and cerebellar hemispheres.

The appearances at necropsy suggested a pulmonary tumour which had metastasised to lymph-nodes, liver, pancreas, adrenals, lungs, and brain. The immediate cause of death was massive hæmorrhage from a gastric ulcer.

Histological Examination

The main pulmonary tumour was a well-demarcated but not encapsulated lesion, separated from the bronchial lining by fibrous tissue and cartilage. In places, the latter was surrounded by tumour. This consisted of cords and masses of pale eosinophilic cells, round or columnar, with small hyperchromatic nuclei which showed moderate pleomorphism. Gland-like formations were occasionally seen. Thin vascular septa separated groups of tumour cells.

The metastases were histologically similar in appearance, although in some cases tumour cells were larger and more columnar. In the right ovary metastatic tumour cells were observed, embedded in a fibroma.

Histological appearances were compatible with a diagnosis of bronchial carcinoid tumour, although no argentaffin granules could be seen in Fontana preparations of the primary or secondary tumours. The diazo method revealed no argentaffin granules in a section of the bronchial tumour, and autofluorescence was not detected. Prof. A. C. P. Campbell kindly examined sections of the tumour, using Hamperl's modification of Bodian's method. He reported that, although there were some areas in which a majority of cells showed a faint argyrophil reaction, most fields were negative.

Sections of both kidneys showed diffuse thickening and sclerosis of glomerular tufts, as well as tubular regeneration and fat droplets. The appearances were those of glomerulonephritis (Ellis type 2). Section of the skin showed prominent melanin in the basal layer of the epidermis. The gastric lesion had the appearance of a benign chronic ulcer.

Investigations of Indole Metabolism

It was possible to obtain only one complete 24-hour specimen of urine for examination. Paper chromatography (Jepson 1955) revealed large amounts of 5-H.I.A.A., 5-H.T. and 5-H.T.P. These were present in the following concentrations:

5-H.I.A.A. (Udenfriend et al. 1955a) = 81 mg. per 24 hr.
5-H.T. (Udenfriend et al. 1955b) = 9·0 mg. per 24 hr.
5-H.T.P. (Sjoerdsma et al. 1960) = 41 mg. per 24 hr.

The 5-H.T.P. level was determined after the specimen had been deep-frozen for 3 months.

Tumour tissue from a liver metastasis was homogenised with 2 vol. *N*/100 hydrochloric acid and ultrafiltered to remove protein. Paper chromatography of the ultrafiltrate revealed the presence of 5-H.T.P. and trytophan. No 5-H.T. or 5-H.I.A.A. could be detected. Rough quantitation of 5-H.T.P. showed 5–10 μg. per g. wet tissue. This was achieved by comparing the spot from the tumour ultrafiltrate with spots produced by adding varying concentrations of 5-H.T.P. to acidified liver homogenate which was taken through the whole procedure.

Discussion

The presence of a well-defined tumour in close proximity to the right lower lobe bronchus suggests that this was the primary lesion—a view supported by the consistently smaller size of other tumour nodules in the lungs. Lack of protrusion into the bronchial lumen is unusual, but Liebow (1952) stressed that the greater part of adenomatoid bronchial tumours is found beneath the surface, and that ulceration of the mucosa is rare.

Although primary gastrointestinal carcinoids may occasionally metastasise systemically, widespread tumour dissemination would appear to be more common in the patient with bronchial carcinoid. Weiss and Ingram (1961), for example, refer to a patient, originally mentioned by Mattingly (1956), who had secondary deposits in kidney, adrenal, and pituitary stalk; Southren's (1960) patient had a solitary metastasis in the choroid of the eye; case 1 of Krikler et al. (1958), the patient of Reingold and Escovitz (1960) and also of Hüsselmann and Wendt (1961), and case 2 of Toomey and Felson (1960) had subcutaneous tumour deposits. Bone metastases, demonstrated radiologically in our patient, were present in five (Anlyan et al. 1960, Hüsselmann and Wendt 1961, Krikler et al. 1958, Toomey and Felson 1960, Weiss and Ingram 1961) out of the twenty-one recorded cases, and in three of these the radiological appearance was described as osteoblastic; secondary deposits in bone are rare in gastrointestinal carcinoid tumour (Toomey and Felson 1960).

Biochemical studies on most of these patients were scanty; there is insufficient evidence to indicate with any degree of certainty whether any of them had 5-H.T.P.-secreting tumours, although the high urinary 5-H.T. output (Sandler and Snow 1958) found in the patient of Bernheimer et al. (1960) is suggestive. It is of interest, however, that, of the proven 5-H.T.P. secretors on whom an adequate clinical description is available (Dick et al. 1957, Sandler and Close 1959, Sandler and Snow 1958; Waldenström et al. 1956 ‡), only the case of Sandler and Snow (1958), in which the primary growth was gastric, did not have osteoblastic metastases. Although the site of primary tumour was unknown in the other three, the case of Dick et al. (1957) had radiological evidence of partial collapse of the lower lobe of the left lung, and in the case of Waldenström et al. (1956) rounded shadows were present in the lung fields. These changes are not incompatible with the presence of a primary bronchial carcinoid. Indeed, we suggest that the finding of an increased urinary 5-H.T.P. output in a patient with the carcinoid syndrome having widespread secondary deposits, especially in bone, should draw attention to the possible existence of such a bronchial primary tumour.

Sandler and Snow (1958) provided strong, though indirect, evidence that the group of carcinoid patients who

‡ B. Pernow, personal communication.

excrete 5-H.T.P. and 5-H.T. in the urine in addition to 5-H.I.A.A. have a 5-H.T.P.-secreting tumour. They suggested that the excretion of 5-H.T. was due to direct renal decarboxylation of 5-H.T.P.—a view which has since received further support (Sandler and Spector 1961). Our finding of 5-H.T.P. in tumour tissue in the case described here is the first direct proof of this hypothesis. The relatively low concentration detected suggests that there may be no storage mechanism for 5-H.T.P. in this type of tumour, in contrast to the 5-H.T.-secreting tumour. Although 5-H.T. could not be detected in tumour tissue from our patient, indicating a complete lack of 5-H.T.P. decarboxylase, it is probable that a deficiency of this enzyme is only partial in some patients in this group. Thus, Smith et al. (1957), investigating tissue from the case of Dick et al. (1957), found high concentrations of 5-H.T. Sandler and Snow (1958) had tentatively suggested that 5-H.T.-secreting ability correlates with the presence of argentaffin granules whilst 5-H.T.P. secretion is found in carcinoid tissue having an argyrophil reaction. Such cases as that of Dick et al. (1957) with an argyrophil reaction only, in a fresh biopsy specimen, point to the view of Sandler and Snow (1958) being an over-simplification. However, none of the proven 5-H.T.P.-secreting tumour cases cited had argentaffin granules.

In the present case, the weak argyrophil reaction and absence of argentaffin granules are compatible with the diagnosis. The significance of the lack of granules is doubtful, however, since the reaction diminishes within a few hours of death (Masson 1924). Weiss and Ingram (1961) could demonstrate an argentaffin reaction in only one out of fourteen cases of bronchial carcinoid, and Williams and Azzopardi (1960) in four out of nine, argyrophilia being present in seven. There are at present insufficient data to attempt any correlation between histochemical appearances and function. Such correlation is hindered by the paucity of pertinent biochemical studies and by lack of information in published cases on the time of formalin fixation, on which the argentaffin reaction depends (Barter and Pearse 1955). That the structure of bronchial carcinoids may have little relation to function is borne out by Williams and Azzopardi (1960), who noted the association of carcinoid syndrome with a tumour having the appearance of an oat-cell carcinoma of bronchus. The case of Reingold and Escovitz (1960) had an anaplastic bronchial primary tumour and developed Cushing's syndrome terminally. A patient recorded by Harrison et al. (1957), who had an anaplastic bronchial carcinoma, raised urinary 5-H.I.A.A. excretion, and Cushing's syndrome, may fall into a similar category.

It is not possible, moreover, to find any close correlation between the amount of 5-hydroxyindole production and clinical symptoms. Whilst some patients with 5-H.T.P.-secreting tumour have a bright red, prolonged flush, associated with increased output of histamine, others do not have any flushing episodes, and in one such case (Sandler and Close 1959) histamine output was normal. Histamine output was not measured in our patient, but it is likely to have been normal as there were no spontaneous flushing attacks. Indeed, it was only possible to induce such an attack with a tenfold increase in the dosage of noradrenaline used by Peart et al. (1959).

It is not necessary to invoke increased secretion of histamine to explain the high incidence of gastric ulcer (MacDonald 1956) in the carcinoid syndrome. Haverback and Bogdanski (1957) have shown that parenteral 5-H.T.P. administration will cause gastric ulcer formation in the rat. If their observation can be extrapolated to man, it is likely that the incidence of gastric ulcer will be higher in those patients with 5-H.T.P.-secreting carcinoid syndrome than in 5-H.T. secretors. The present case and that of Sandler and Snow (1958) had gastric ulcers. Three of the published cases of bronchial carcinoid tumour (Anlyan et al. 1960, Schneckloth et al. 1959, Williams and Azzopardi 1960 [case 2]) also had this lesion. The case of Schneckloth et al. (1959) received careful biochemical scrutiny, but the authors were unable to detect 5-H.T.P. although another, unknown, 5-hydroxyindole was present. Such careful biochemical examination combined with detailed clinical observation is the key to further advances in our knowledge of the carcinoid syndrome.

Summary

A case of primary bronchial tumour and carcinoid syndrome is described.

In addition to the finding of 5-hydroxytryptophan, 5-hydroxytryptamine, and 5-hydroxyindoleacetic acid in her urine, 5-hydroxytryptophan was detected in tumour tissue. This is the first direct evidence of the existence of a 5-hydroxytryptophan-secreting tumour.

The finding of widespread secondary deposits, especially in bone, and raised urinary 5-hydroxytryptophan levels are possible aids to the diagnosis of bronchial carcinoid tumour.

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Preliminary Communication

A NEW FIBRINOLYTIC AND ANTICOAGULANT ENZYME

DIFFERENT species of pseudomonas produce different intracellular and extracellular enzymes.[1–5] The biochemical activities of these enzymes are closely dependent (1) on the species of pseudomonas, (2) on the composition of the culture media, (3) on the duration of the growth, and (4) on many other physicochemical factors. From a strain of *Pseudomonas fluorescens* an extracellular enzyme has been obtained which has strong fibrinolytic and anticoagulant properties.

An unidentified strain of *Ps. fluorescens* was cultured in special liquid media for two weeks. The culture was filtered through Seitz filters, and the enzyme contained in the sterile filtrate was partially purified by precipitation techniques, using methanol-acetone. The enzyme is completely soluble in water, but not in fat solvents. It is inactivated at pH below 3·5 or above 11. The maximum activity was found at pH 7·6. It is stable at room temperature for several days in solution, but loses its activity after incubation at 60°C for fifteen minutes. The nitrogen content of different samples ranged from 3·74 to 4·4%. However, this probably does not represent the actual value, since by paper chromatography seven components were detected, only one of which showed fibrinolytic and anticoagulant properties.

Experiments in Vitro

The fibrinolytic activity of the enzyme was determined on heated fibrin plates (Astrup-Mullertz [6]), and on unheated fibrin clots. The anticoagulant effect on human and dog plasma was detected by incubating 50 μg. of enzyme in 1 ml. of plasma or serum for various lengths of time. The different coagulation factors were estimated using standard coagula-techniques.

Experiments in Vivo

The lyophilised enzyme was dissolved in 100 ml. of saline, and infused to three dogs (15 mg. per kg. body-weight). Four samples of blood were collected for study: (1) before infusion (control); (2) at the end of the infusion; (3) thirty minutes after the infusion; and (4) sixty minutes after the infusion. The changes in the coagulation mechanism were detected by standard coagulation techniques.[7 8]

Results in Vitro

On heated fibrin plates, 1 μg. of enzyme contained in 0·1 ml. distilled water produced lysis after incubation for sixteen hours at 37°C. The effect of higher concentration (1 mg. per ml.) was very rapid. Lysis occurred within three minutes.

When plasma and serum were incubated as described, it was found that at the end of the first hour the Quick prothrombin-time was increased, the factor V was decreased, and the fibrinogen level had fallen sharply. The prothrombin and proconvertin (factor VII) were slightly changed. From the thromboplastic generation test, it was concluded that the anti-hæmophilic globulin was slightly decreased, but there was no change in P.T.C. (Christmas factor; factor IX). In the following hour of incubation the anticoagulant effect was more prominent. At the end of the third hour, the Quick prothrombin-time was more than three minutes, probably because of the low level of fibrinogen and to some extent because of the deficiency of factor V.

Results in Vivo

The first sample of blood (before infusion) did have a normal clotting-time and normal retraction. The other three samples (after infusion) did not clot. It was noticed again that the factors affected most in vivo were fibrinogen, factor V, and the anti-hæmophilic globulin. Prothrombin and proconvertin were moderately decreased and P.T.C. was not affected in all the samples.

The fibrinolysis noticed in vitro and in vivo proved to be the direct result of the enzyme, and not due to an activation of the fibrinolytic system of the blood.

Side-effects

During the infusion it was noticed that there was a drop of the blood-pressure (40 mm. Hg) when 15 mg. per kg. body-weight was given, but no change with 7·5 mg. per kg. The heart-rate was slightly decreased and the respiration-rate moderately increased. No hæmolysis was noticed.

It is very possible that the side-effects are due to the presence of impurities in the preparation used. More extensive studies will be directed towards isolation and biochemical characterisation of the enzyme, and further evaluation of its lytic effect in induced experimental thrombosis, by means of radioactive fibrinogen.

Joseph Stanton Memorial Laboratories of Saint Elizabeth's Hospital, and the Department of Medicine, Tufts University School of Medicine, Boston, Massachusetts

DIONYSIOS M. ADAMIS
M.D. Athens
Advanced fellow of the American Heart Association; Acting director of the Joseph Stanton Memorial Laboratories

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New Inventions

CASUALTY TROLLEY

A SEVERELY injured patient usually has to be transferred from an ambulance stretcher to a hospital trolley, from the trolley to an examination couch, and, often, from the couch on to an X-ray table or operating-table. With a trolley which can fulfil any of these functions, movement can be kept to a minimum; the trolley illustrated here has been designed specifically for the casualty department. It is easily guided through doors and into lifts. The patient arriving by ambulance is put on the trolley and taken into the casualty department, where it serves as an examination couch. If necessary, it can then be used as an X-ray table or a minor operating-table. When the injury has been diagnosed and treated the patient can remain on the trolley until fit enough to be moved elsewhere.

The plastic top of the trolley is translucent to X-rays; and a sliding tray beneath it will receive a cassette from either side or end in order to take an anteroposterior film of a supine patient. The trolley top is divided into two almost equal sections, the upper one of which can be raised to the vertical. This allows the patient to sit up comfortably from the hips and not, as is usual, by producing a thoracolumbar kyphosis. The sitting position is helpful for dyspnœic patients and enables a posteroanterior chest X-ray to be taken from behind the trolley with the patient holding the cassette to his chest.

The trolley top is surrounded and supported by a steel frame faced with rubber as a bumper bar. This frame is

The casualty trolley in the Trendelenburg position, with side guards and transfusion pole: (A) cassette holder for lateral radiography; (B) side-table; (C) cage for oxygen cylinder.

pivoted at its point of balance so that a Trendelenburg position can be rapidly obtained by pressing down the head of the trolley after releasing a spring-loaded catch. The operator remains at the head end of the trolley during this manœuvre.

The frame is provided with a number of sockets on either side, enabling attachments to be arranged in a variety of ways. A pair of side guards are useful for a restless patient or one recovering from a general anæsthetic. A side-table can take either an arm or instruments.

A cassette holder for taking lateral radiographs of the supine patient also fits into the frame, and a cassette can be positioned vertically anywhere along the length of the trolley. In order to avoid the loss of film, which normally occurs due to the thickness of the cassette, it has been made so that the lower edge of the cassette drops below the level of the trolley top.

A transfusion pole is stored longitudinally in the chassis; when required, it fits into a socket either at the top or bottom end of the trolley. The other attachments are also stored in the chassis, together with a cage for an oxygen cylinder. The holder for the side-table forms a useful tray on the chassis. The trolley is mounted on individually locking castors.

The casualty trolley is manufactured by A. C. Daniels & Co., Ltd. 41, New Cavendish Street, London, W.1.

Fulham Hospital,
London, W.6

G. E. FULFORD
M.B. Lond.

Reviews of Books

Disease and Injury

Editor: LEOPOLD BRAHDY, M.D., formerly physician-in-charge: Occupational Diseases and Injuries, City of New York, and lecturer in radiology, New York University Medical School. Philadelphia: J. B. Lippincott. London: Pitman Medical Publishing Co. 1961. Pp. 482. 100*s*.

HOW many doctors when they look at an injury instinctively consider the legal implications in the same way that they check, almost subconsciously, the possible medical complications and sequelæ? Yet many traumatic cases are bound to involve compensation, since so many take place at work or on the road. And in most compensation cases a clear history of the initial event and an accurate note of the extent of the lesions is as important as a proper assessment of the final disability.

The purpose of this book is to help both doctors and lawyers to estimate how far trauma may be responsible for subsequent disease. There are those cases where the relationship is obvious—wrist drop following fracture of the humerus, for instance—and the final disability is wholly attributable: there are those which clearly have no relationship. But there is a large intermediate group where trauma may have precipitated an event which was likely to happen because of underlying constitutional disorder but might not have taken place for years—an obvious example is precipitation of gangrene by trauma in an arteriosclerotic patient's foot.

This book is concerned mainly with this last group. It is well written and the whole subject is treated with sound judgment. Many doctors are uneasy about giving evidence of this kind, partly because they are afraid of cross-examination and partly because they are uncertain of what constitutes constitutional disorder and what aggravation. This book is a notable contribution towards better medical witnesses, and it will also be of much value to lawyers.

Good Health in the Tropics

Advice to Travellers and Settlers. W. H. JOPLING, M.R.C.P., D.T.M. & H. Hospital for Tropical Diseases, London. Bristol: John Wright. 1961. Pp. 27. 3*s*. 6*d*.

THIS paper-bound booklet offers advice to travellers and intending settlers bound for the tropics. It is in two sections, one of which deals with preparations such as immunisation against smallpox, yellow fever, cholera, and other diseases, and the other with instructions on how to live in health in an unhygienic and possibly hostile environment. Special attention is paid to methods of protection against malaria and other parasitic diseases. There are particularly useful comments on servants, on household pets, and on the care of the infant. Travellers are advised to stay some of their enthusiasm for buying tropical clothing until they have arrived and have had time to observe local customs—a shrewd tip on how to avoid useless expense. Given a large circulation, informed advice of this nature could perform good service.

Family Spending Patterns and Health Care

H. ASHLEY WEEKS, with the assistance of LEAH GLASS, DOROTHEA HUBIN, and HOWARD KAPLAN. Cambridge, Mass.: Harvard University Press. London: Oxford University Press. 1961. Pp. 140. 28*s*.

Why do some families take better care of their health than others? Can part of the answer be found in their spending pattern and income? To investigate, New York University sent a team of sociologists armed with questionaries across the river to Hackensack. They interviewed only white native-born Protestant families, thus excluding people underprivileged because they were old or coloured or lived in depressed areas. They asked about income and expenditure, use of health services, and previous history of the parents. Attitudes were assessed by such questions as "if you received $1000, what would you do with it?" and "what are your family goals?". The final question was "why would you say some people take better care of their health than others?".

Of the families who said they put off going to a doctor (about 3 out of 5), 14% said that this was because of the cost of medical care; the proportion was 5% in the richest and 55% in the poorest group. The number of visits to a doctor, however, seemed to be unrelated to income and averaged about 11 per family per year: but the richer families tended to spend more on their doctors, and much more for dental and optical care. All told, the families spent 3% of their income on medical care, on top of the health insurance premiums paid by most of them; and a third of the families said that they had financial problems because of medical expenses. On the other hand, when asked why they thought some people took less care of their health than others, only 1% of the families mentioned fear of bills.

These answers cannot, of course, be taken entirely at their face value, for the poorer people may use finance to conceal some other reason for not going to a doctor, and the richer may not care to admit their financial worries. Those who tended to put off calling the doctor more than others were those who bought on impulse or on the instalment plan; those who budgeted their expenditures; those whose wives had been

unhealthy in childhood; and those whose aims centred more on material goods than on their children's education.

Though the answers do not support the claims of those representatives of the American Medical Association who say they have heard of no case of lack of medical care for want of money, they do not indicate that penury keeps medical care out of the reach of ordinary Americans—at least, native-born white Protestants of unbroken families.

Letters of Sigmund Freud 1873-1939

Editor: ERNST L. FREUD. Translated by TANIA and JAMES STERN. London: Hogarth Press. 1961. Pp. 464. 50*s*.

FREUD was a prolific and conscientious letter-writer, dealing with his enormous correspondence unaided and answering every letter he received, usually within twenty-four hours. His son, who mentions this in a preface, has here selected 315 letters mostly concerned with Freud's personal life, "in the hope that those who know Sigmund Freud only from his work shall receive here a portrait of the man, of the percipient, thinking, battling human being". This aim, it may be said at once, is admirably realised. The letters are edited with the minimum of footnotes, but an index gives brief biographical data about the addressees. The first half of the book is devoted mostly to some of the letters written to his fiancée, Martha Bernays, during the long periods of separation in their four-year engagement. These are delightful love-letters, their tenderness and passionate impatience at the long postponement of marriage necessitated by his struggle to establish himself in his profession graphically depicting Freud's tenacity both in love and work. Deeply in love, his burning desire for complete honesty and mutual understanding between his betrothed and himself has produced letters poignant with a lover's unbelief that he is equally loved, with doubts and fears and rapturous renewals.

From 1886 onwards, the letters are chiefly to Freud's professional associates—Breuer, Fliess, Jung, Eitingon, Abraham, Ferenczi, Rank, Pfister, Marie Bonaparte, and Ernest Jones.

There are also many letters to men and women famous in the arts and sciences, including Yvette Guilbert, Einstein, Arnold and Stefan Zweig, Romain Rolland, Thomas Mann, and H. G. Wells. Always there is the background of Freud's work and of his happy family life; but the letters of this man, so intensely interested in the world of ideas, also depict the vicissitudes of the psychoanalytic movement, the continued frustration from medical circles in his native land, and the growing menace of the Nazis. The carcinoma of the jaw which was to terminate his life recurs from 1923 onwards, mostly in succinct references to painful operations and the deprivation of his beloved cigars. The last few letters were written from Hampstead, to which Freud and his family had escaped in 1938, and where he still continued to work.

Clinical Electroencephalography

L. G. KILOH, M.D., B.SC., M.R.C.P., D.P.M., reader, department of psychological medicine, King's College Medical School, University of Durham; J. W. OSSELTON, B.SC., lecturer in electronics, Royal Victoria Infirmary and King's College Medical School, University of Durham. London: Butterworths. 1961. Pp. 135. 50*s*.

A SHORT book on clinical electroencephalography is certainly needed: existing ones are either too large and technical or too purely descriptive. This volume has useful verbal descriptions and often illustrations of the E.E.G. changes that may accompany a number of clinical conditions. This unfortunately suggests that the E.E.G. is a specific diagnostic instrument. The authors in fact do not hold this view, and in their last chapter argue very sensibly and cogently that it is really a method of sampling one aspect of cerebral function. The argument would have been reinforced if they had considered their examples, and indeed some of the "provocation" techniques, under the headings of biochemical and physiological variations in the environment of cerebral function. Such an approach can be integrated with clinical E.E.G. practice, and an exposition on these lines is badly needed.

Uveitis and Toxoplasmosis

E. S. PERKINS, PH.D., M.D., F.R.C.S., reader in ophthalmology, Institute of Ophthalmology, University of London. London: J. & A. Churchill. 1961. Pp. 142. 30*s*.

This is an account of the clinical and laboratory findings in some 1700 cases of uveitis. In this massive material, ætiological factors were not often established and evidence is advanced for the view that toxoplasmosis is a significant cause, particularly in juxtapapillary choroiditis. Pyrimethamine is advocated in the treatment of presumed toxoplasmic choroiditis on rather unconvincing grounds. In the classification used, a sharp distinction is made between anterior, posterior, and generalised uveitis; these three forms are also described as having acute and chronic varieties. The author holds that the distribution of these different forms of uveitis is influenced by sex, and, as the different varieties have their own ætiology, there is a considerable difference in the pattern of the disease in the two sexes.

Atlas of Anatomy and Surgical Approaches in Orthopædic Surgery

Vol. 2. Lower Extremity. RODOLFO COSENTINO, M.D. Springfield Ill.: Charles C. Thomas. Oxford: Blackwell Scientific Publications. 1961. Pp. 264. 112*s*.

THE techniques of meticulous dissection and painstaking photography which distinguished the first volume of Professor Cosentino's atlas are displayed to even greater advantage here. For this is concerned with structures which are in general larger than their counterparts in the arm, and includes many illustrations of pelvic anatomy which have an almost stereoscopic quality. Particularly striking are the layer-by-layer views of the hip, as exposed by each of the more commonly used approaches. Surgeons will find this book as valuable as its fellow. Students, who will see it as the ideal dissection manual, may regret that it is inevitably rather highly priced. By no standards, though, can it be called expensive.

Forensic Medicine (4th ed. London: Edward Arnold. 1961. Pp. 355. 32*s*. 6*d*.)—The 3rd edition of Dr. Keith Simpson's book won the Swiney Prize, and this one is certainly no less deserving. It is compact and concise—perhaps a little too concise in places, particularly when dealing with common poisons such as the barbiturates. It might be an advantage to include in future a simple test for barbiturates and to give rather more detail about the clinicopathological tests for aspirin. The increase in the text could be offset by giving less space to tests for arsenic. A further minor point is whether, in the subsection on the estimations of stature, the two tables are needed: unless there are more precise instructions for measuring bones, the results are unlikely to be reliable, and in any case where this investigation is needed it is best done by an expert or, at least, with reference to more advanced works on the subject. Future editions will certainly amend the assertion that survivors of suicide pacts will be charged with murder. This book should by now be widely known and used, offering up-to-date and helpful information on practical medicolegal affairs, and it continues to be eminently suitable for the medical student and the practitioner.

The Encyclopedia of the Biological Sciences (New York: Reinhold Publishing Corporation. London: Chapman & Hall. 1961. Pp. 1119. 160*s*.)—Some 500 workers from more than thirty countries have contributed to this volume, edited by Dr. Peter Gray, of the University of Pittsburgh, and each has dealt with his subject in a full-length article, sometimes of several pages. The book is in fact as well as in title an encyclopædia and not merely a dictionary. Preclinical students will find it an instructive supplement to their conventional textbooks, though only part of its contents is of direct concern to doctors. Many of its short biographies however (including those of Virchow and Claude Bernard) and some of its monographs (such as those on poisonous snakes or viruses) have a particular medical significance. And several others, such as those dealing with biological warfare and with Space biology, will interest many readers.

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Epidemiology of Common Colds

WITH the autumn's first drop in temperature the incidence of colds and allied ills has increased. This phenomenon is as regular as it is mysterious. We are often told by jocular lay friends that we completely fail to understand the common cold. But that is no longer true. Substantial progress has been made in cultivating in the laboratory the causal viruses, and the complex epidemiology of the disease is being patiently unravelled.

A further contribution to our epidemiological knowledge has been made by LIDWELL and WILLIAMS,[1] who studied the occurrence of colds in office workers and their families in London and Newcastle. LIDWELL and SOMMERVILLE [2] had previously carefully recorded every cold in a series of families in a Wiltshire village, and showed that in a rural area schoolchildren caught colds three times as often as adults and passed them on to adults and to the pre-school children, the latter being twice as susceptible as schoolchildren. Using basically similar methods LIDWELL and WILLIAMS have for six years recorded the incidence and clinical features of colds in a large Government office in Newcastle; two small Government offices and a commercial office in Central London were studied for part of the time. The families studied were in Newcastle and were under observation for three years. For much of the investigation around 1000 individuals were studied, and very few of those invited to join failed to collaborate. The results were subjected to full statistical analysis.

Some of the tabulations reinforce the impressions which many practitioners must have. For example, 10·3% of colds led to absence from work, and the average length of absence was 2·6 days. Women between 30 and 40 years of age were away longer than men (3·3 days, compared with 2·0 days), although younger and older women stayed away about the same time as did men. Women over 40 were away with a cold significantly more often than men. Colds were classified according to whether sore throat, cough, and fever were associated with the typical nasal symptoms; and there was a significant tendency for the same symptom pattern to occur when the cold was transmitted to other members of the family. The importance of various personal and environmental factors was studied by fitting linear regression equations to the observed data. From the results it seemed that age was an important factor, adults under 30 being relatively susceptible and those over 40 relatively resistant. Non-working wives and mothers had more colds if there were infants or schoolchildren in the house.

By analysing the serial interval between successive colds within a household it was shown that these were not distributed at random in time, but that they occurred usually at a median interval of 2·5 to 3·3 days—about the time required for experimental colds to develop after intranasal inoculation of a washing. Nevertheless cross-infection within the family could not account for all the colds. It was found that infants and children were highly susceptible, but (probably because of differences in social behaviour) children were less important in spreading infection in Newcastle than they were in rural Wiltshire. Women without children who went out to work had more colds than those who did not. By contrast there was little evidence for cross-infection in offices; only about one in ten could be accounted for in this way, and measures to limit or prevent virus infection at work had no effect on the incidence. Some persons apparently caught colds from the people they sat next to, but LIDWELL and WILLIAMS thought that infections might usually be acquired from workers with symptoms too slight to be called a cold, or, alternatively, from fomites bearing virus. Finally they showed that for 8 weeks after a cold the risk of a second cold was reduced, particularly for those who tended to get relatively few colds anyhow.

One might leave the matter there, on the supposition that this study marks a high point in the " shoe-leather " epidemiology of common colds. But if recent laboratory findings are valid they should be consistent with the epidemiological findings, and it may not be too soon to try to correlate the results obtained by both types of study. The viruses isolated from patients with common colds include parainfluenza [3] and respiratory syncytial viruses.[4 5] These particularly affect children and may cause serious respiratory-tract disease, but in the presence of antibody they may reinfect and cause milder disease resembling colds. Salisbury strain viruses, or rhinoviruses, can be isolated from about a third of young adults with colds,[6] and they are probably responsible for additional illnesses in which they are not isolated. Most of the viruses isolated from adults with colds are rhinoviruses, which seem to lead usually to an antibody response in man. Circulating antibody protects against experimental infection,[7] with these viruses, and the repeated illnesses in adults are therefore probably due to infection with a succession of viruses of different antigenic types.[6] Adults usually have antibodies against these viruses, but such antibodies are much less common in sera of children.[8] This lack of antibody could account, at least partly, for the greater susceptibility of children, which has been demonstrated in the field. It would be interesting to

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establish the level of antibodies in people who give a history of especially frequent or infrequent colds.

Experimental colds produced by rhinoviruses have an incubation period of from 2 to $2^1/_2$ days. Those produced by parainfluenza and respiratory syncytial viruses and a few incultivable agents have an incubation period of about 4 days. Assuming that patients become infectious about the time when symptoms begin, these figures agree reasonably with the data of LIDWELL and WILLIAMS, and the finding that rhinoviruses are common causes of colds in adults. In volunteers different virus strains produce slightly different clinical features,[6 9] which accords with the tendency for the colds in Newcastle to "breed true" as they spread round the families.

Laboratory studies may also have a bearing on the method of spread of the virus. TYRRELL and BYNOE [6] at Salisbury were able to isolate virus from only 3 of 25 volunteers who had been inoculated with a rhinovirus and who failed to develop symptoms. This does not support the suggestion that colds develop by infection from persons who have few or no symptoms. Perhaps, however, some of the cases termed colds under the close scrutiny at the Salisbury research unit would have been too mild to be called colds in the offices at Newcastle. There is no reported work on the stability of rhinoviruses and other "new" respiratory viruses on fomites, but this information could now be readily obtained.

The time is now ripe for an ætiological and epidemiological study of colds and similar mild respiratory infections. A careful study could be carried out simultaneously in different centres. The viruses could be cultivated from persons with colds and from others without symptoms, and the clinical and epidemiological features of the illnesses could also be studied. If in such a study it were found that a new virus appears every 2 months or thereabouts, then this might explain the apparently brief resistance to infection observed in the studies of LIDWELL and WILLIAMS. Perhaps each virus is related to a peak of incidence. We should perhaps avoid further speculation and wait for more facts, but it is encouraging to think that such investigations are now practicable. The answers will come in the end.

Ventricular Septal Defect

THE successful surgical treatment of ventricular septal defect has focused attention on the natural history of the disease. The course in the first years of life is well established. Patients with small defects usually have no symptoms in infancy. But those with larger defects commonly fail to thrive in the first year, have recurrent respiratory infections, are difficult to feed, and may succumb to heart-failure.[10–13] If they survive the first year they usually improve, and in childhood are often remarkably active. They may be surprisingly free of symptoms, though easily tired, underweight, and still a prey to respiratory infections. At this stage many children with large defects have either appreciable pulmonary vascular disorder and pulmonary hypertension, or hypertrophy of the infundibulum of the right ventricle, or both. The former, although a serious complication, paradoxically gives temporary relief by taking some of the strain from the left ventricle at the expense of the right. Infundibular hypertrophy tends to protect the lungs from the effects of a torrential left-to-right shunt and, unless extreme, is beneficial.

Pulmonary vascular disease and pulmonary hypertension do not tend to increase in infancy,[14 15] but can progress in later life.[16 17] Patients with little or no pulmonary hypertension in early life do not tend to develop pulmonary vascular disease later: pulmonary vascular disorder is determined in the very early days of life when the impact of a torrential pulmonary blood-flow at systemic pressure on the naturally thick-walled pulmonary vessels tends to induce vasoconstriction, which maintains a high vascular resistance and ultimately damages the pulmonary vessels. In about 16% of patients the normal high pulmonary vascular resistance at birth fails to fall, owing to the communication between the lungs and the left ventricle, and the Eisenmenger reaction develops, with pulmonary-artery pressure at systemic level, little or no left-to-right shunt, and a small right-to-left shunt.[18] These patients may have an unclouded first year of life, but become handicapped later, and in adolescence or early adult life may die of right ventricular failure or pulmonary infarction. Little is known of the natural history of ventricular septal defect in adolescence and adult life, for few adult patients are seen either in life or at necropsy. Recent reports by EVANS et al.[19] and NADAS et al.[20] of spontaneous closure of defects are therefore of great interest.

The idea that closure may take place spontaneously is not new, but these reports are of value in demonstrating by cardiac catheterisation and angiocardiography the disappearance of a left-to-right shunt. The age at which the defect apparently usually closes varies from 2 to 4 years, but in one child it remained open until the age of 9 years. Spontaneous closure was not confined to small defects, for the left-to-right shunt was large in all NADAS et al.'s patients, who were in heart-failure in infancy. Disappearance or diminution of the murmur in a patient with ventricular septal defect suggests its closure, but cannot be accepted as proof of this unless hæmodynamic data exclude severe pulmonary hypertension, which is known to shorten and diminish the murmur. This has been excluded by the finding of

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normal or near normal pulmonary-artery pressures at the second catheterisation, when the left-to-right shunt had disappeared.

EVANS et al. consider that the type of defect which may close spontaneously can be suspected from the characteristics of the systolic murmur, which has a superficial and blowing quality suggesting high-frequency vibrations. They suggest that septal hypertrophy may close the defect, and by means of angiocardiography and intracardiac phonocardiography were able to localise it to the muscular portion of the septum in 4 of their patients. Most defects, however, lie in the membranous part of the septum, and the medial leaflet of the tricuspid valve may close small defects at this site.[20 21] There are other possible reasons why patients with ventricular septal defects may not be seen in later life. It is now well established that infundibular obstruction may develop to such a degree that the left-to-right shunt reverses, and the condition becomes clinically indistinguishable from the tetrad of Fallot.[17 22] Patients with the tetrad who give a history of respiratory infections without cyanosis in early life, and have infundibular stenosis without valvular stenosis or a subvalvular diaphragm, may have started life with a ventricular septal defect with left-to-right shunt. Finally, small defects in the muscular septum may be difficult to detect at necropsy [23] so that the diagnosis is not appreciated.

It is generally believed that all but small defects cause a poor ultimate prognosis, so that surgical treatment is desirable,[24 25] not only to prolong life, but to improve health, physique, growth, and effort tolerance in children. KIRKLIN et al.[26] have reported the surgical results in 320 consecutive patients over a five-year period. In 1959 the mortality-rate was only 6% for patients with mild or moderate pulmonary hypertension, and in 1960 only 2 of 76 such patients died. Where severe pulmonary vascular disorder was present, the mortality was 20%. In this country GOODWIN,[27] CLELAND,[28] and HOLLMAN [29] have reported similar results in 100 patients operated on in the past three years, only 1 of 44 patients operated on in 1960 having died.[28]

Patients with small defects, normal heart size, a ratio of pulmonary to systemic blood-flow, measured by cardiac catheterisation, of less than 1·5 : 1, and normal pulmonary-artery pressure may safely be left alone. They have no symptoms and their prognosis is excellent. Operation should be recommended for patients with larger defects and shunts, cardiac enlargement, and pulmonary hypertension; and there is great need for operation in those with very large defects, torrential pulmonary blood-flow, and pulmonary vascular disease. Conversely, patients with severe pulmonary vascular disease, a negligible left-to-right shunt, and a small right-to-left shunt with central cyanosis are at present best regarded as inoperable. The results of operation are related to the level of the pulmonary vascular resistance, the risk being up to 5% if the resistance is less than 8 units, and up to 20% if the resistance is between 8 and 20 units.[23 27 28] The degree of pulmonary vascular disorder is best assessed by the length of the systolic murmur, a full-length murmur and thrill indicating a low resistance, and a short ejection murmur a high resistance.[23 27 28] The degree of pulmonary vascular disease and the final result are also related to the fall in pulmonary-artery pressure obtained immediately after closure, a good fall to less than 50% of the systemic pressure being obtained in patients with reversible pulmonary vascular disorder and a low or moderate pulmonary vascular resistance. In such patients a satisfactory final result can be confidently predicted.[27 28] The risks are increased by associated cardiac abnormalities, of which the most important are mitral-valve disease, corrected transposition of the great vessels, aortic-valve disease, and patent ductus arteriosus.[26 27] These associated anomalies are by no means uncommon,[30] and since, if surgery is contemplated, it is vital to know in advance whether these complications exist, selective angiocardiography is advisable in patients with any anomalous physical signs. Patency of the ductus arteriosus may be silent when associated with a ventricular septal defect, the typical continuous murmur being absent.[23 31] Since the unexpected finding of a patent ductus may seriously compromise the outcome of operation, preoperative diagnosis is important, especially in the hypertensive patient. Preoperative aortography is therefore advisable in every patient with a ventricular septal defect and an early diastolic murmur in the region of the pulmonary artery. Patients with aortic or mitral valve disease, or corrected transposition, present special problems, and, while surgery may be successful, it should only be undertaken after very careful assessment of the risks.

The major hazard of the operation itself is the development of complete heart-block, which if permanent may be lethal.[26 27] This is not always related to the placing of a stitch in the septum, but may be due to tension and bruising round the bundle of His and atrioventricular node. It is also more likely in patients with severe pulmonary vascular disease, when the hazard to the patient is greater.[27 28]. Complete heart-block may occur in up to 15% of patients, but is likely to be permanent in only 5%.

Residual left-to-right shunts due to persistence of a small defect after operation are less common than previously,[26] but nevertheless still constitute a problem.

21. Hoffman, J. I. E., Rudolph, A. M., Nadas, A. S., Gross, R. E. *Circulation*, 1960, **22**, 405.
22. Gasul, B. M., Dillon, R. F., Vrla, V., Hait, G. *J. Amer. med. Ass.* 1957, **164**, 847.
23. Cleland, W. P., Beard, A. J. W., Bentall, H. H., Bishop, M. B., Braimbridge, M. V., Bromley, L. L., Goodwin, J. F., Hollman, A., Kerr, W. F., Lloyd-Jones, E. B., Melrose, D. G., Teliviuo, L. J. *Brit. med. J.* 1958, ii, 1369.
24. Lillehei, C. W., Cohen, M., Warden, H. E., Varco, R. L. *Surgery*, 1955, **38**, 11.
25. Gerbode, F., Osborn, J. J., Melrose, D. G., Perkins, H. A., Norman, A., Baer, D. M. *Lancet*, 1958, ii, 284.
26. Kirklin, J. W., McGoon, D. C., DuShane, J. W. *J. thorac. cardiovasc. Surg.* 1960, **40**, 763.
27. Goodwin, J. F. *Proc. R. Soc. Med.* 1961, **54**, 783.
28. Cleland, W. P. *ibid.* p. 785.
29. Hollman, A. *ibid.* p. 787.
30. Pitman, R., Morgan, J., Steiner, R. E., Hollman, A., Goodwin, J. *Brit. Heart J.* 1961, **23**, 458.
31. Sasahara, A. A., Nadas, A. S., Rudolph, A. M., Wittenborg, M. H., Gross, R. E. *Circulation*, 1960, **22**, 254.

18 of 95 cases reported by British workers [27–29] had residual shunts, although in 11 these were very slight and did not impair the patient's improvement after the operation. The great majority of children notice increased physical vigour and decreased tiredness and dyspnœa in the months following the operation.[29] Many retain a soft systolic murmur, and only when a systolic murmur is loud and long does it suggest that the defect is open.[29]

Repair of ventricular septal defects in children under the age of a year is difficult and hazardous; but in those who are gravely ill from heart-failure, despite full medical treatment, the practice of constricting the pulmonary artery to reduce the torrential pulmonary blood-flow now yields encouraging results.[32] The surgical treatment of ventricular septal defect after infancy is firmly established, although the major problems of avoiding heart-block and achieving complete closure of the defect have yet to be solved. The risks of operation are now small; but they are not to be dismissed, and this, together with the possibility of spontaneous closure of some defects, should dictate caution in recommending operation for symptomless children. But the results of closure of a large defect can be among the most gratifying in cardiac surgery.

Uveitis

UVEITIS is the cause in 8% of cases of blindness in the fourth decade of life and in 2·5% of all cases of blindness in this country.[33] An extensive and well-planned investigation of this disorder is being carried out at the uveitis clinic of the Institute of Ophthalmology, London. The results of this continuing study have been reported in detail by PERKINS.[34]

The analysis is based on the records of 1718 patients, most of whom were referred to this special clinic from Moorfields Hospital. The cases have been classified anatomically into three groups—anterior, posterior, and generalised uveitis—with subdivision into acute or chronic, single or repeated attacks, and involvement of one or both eyes. The whole series of 1718 was made up of 1082 (63%) cases of anterior uveitis, 327 (19%) of posterior uveitis, and 309 (18%) of generalised uveitis. With both anterior and posterior uveitis, acute cases were over four times commoner than chronic.

Whereas in the whole series males predominate only slightly, in the acute anterior uveitis group they are definitely in excess—a feature noted also in a Norwegian survey.[35] This may be due to non-specific prostatitis, which apparently is often associated with acute anterior uveitis. CATTERALL [36] investigated 211 men with uveitis in this series and found prostatovesiculitis in 69% (in controls of the same age-group in the general medical and surgical wards of two hospitals the prevalence was only 19%). Of male patients with acute anterior uveitis, no less than four-fifths had chronic prostatitis. Commonly associated with chronic prostatitis and uveitis were ankylosing spondylitis, arthritis, sacro-iliitis, conjunctivitis, urethritis, and plantar fasciitis—disorders which CATTERALL regards as constituents of a single syndrome of which the likeliest cause is the chronic genital infection. Nevertheless, extensive investigations failed to reveal a causal organism. The fact that no such organism has been identified in the century and a half since BRODIE [37] first drew attention to the syndrome suggests that the cause may after all not be infective. It is certainly worth re-examining this disorder in the light of our new knowledge of autoimmunity. Acute anterior uveitis in women PERKINS attributes to ankylosing spondylitis or Reiter's disease in 8% and to sarcoidosis in 4% of instances; but in some 80% of cases no cause could be found. Likewise in chronic anterior uveitis no cause could be established in most cases.

By contrast, in acute (but not in chronic) posterior uveitis evidence of toxoplasmosis was found in 70% of cases. This evidence was detected chiefly by means of two serological tests—the cytoplasm-modifying dye test [38] and the complement-fixation test.

The former test depends on inhibition by specific serum antibody of the capacity of toxoplasma organisms to take up and be stained by methylene-blue. This test is a reliable index of previous infection, whereas the complement-fixation test, which does not remain positive for so long, suggests recent or present infection.

The dye test was positive at least five times oftener than the complement-fixation test. In a small blind trial, pyrimethamine was found to benefit three-quarters of cases of uveitis where the toxoplasma dye test was positive; but, like the placebo, it also benefited half of a group of cases with no serological evidence of toxoplasma infection.

Sarcoidosis, the commonest recognisable cause of chronic generalised uveitis, accounted for 55 of the 1718 cases reported by PERKINS. As JAMES [39] has pointed out, although sarcoidosis affects both sexes to about the same extent, in those patients with eye or skin lesions there is a conspicuous preponderance of females. Sarcoid uveitis is usually described as a granulomatous iritis with iris nodules, mutton-fat keratic precipitates, and a wax-spot type of peripheral choroidoretinitis. Surprisingly, one or more of these features was noted in only 12 of the 55 patients with ocular sarcoidosis. This is particularly significant since the series is an ophthalmic one in which these features are unlikely to have been overlooked. The diagnosis of sarcoidosis was established by other pieces of evidence, including abnormailites in chest radiographs, skin lesions, and positive Kveim tests. PERKINS points out that sarcoid uveitis is but the ocular manifestation of a general disease.

This survey is proving of great value not only to ophthalmology but to other specialties, where it is throwing new light on old problems.

32. Morrow, A. G., Braunwald, N. S. *ibid.* 1961, **23**, 34.
33. Sorsby, A. Causes of Blindness in England, 1951–54. H.M. Stationery Office, 1956.
34. Perkins, E. S. Uveitis and Toxoplasmosis. London, 1961.
35. Haarr, M. *Acta ophthal., Kbh.* 1960, **38**, 37.
36. Catterall, R. S. *Lancet*, Sept. 30, 1961, p. 739.
37. Brodie, B. C. Pathological and Surgical Observation on Diseases of the Joints; p. 54. London, 1818.
38. Sabin, A. B., Feldman, H. A. *Science*, 1948, **108**, 660.
39. James, D. G. *Amer. J. Med.* 1959, **26**, 331.

Annotations

URINARY INFECTION IN PREGNANCY

DESPITE improved methods of treating acute urinary-tract infections we still know very little about the pathogenesis of these common and potentially serious conditions. Even the paths by which bacteria enter the urinary tract are still disputed; but whereas formerly the route was believed to be usually the blood stream, direct spread via the urethral lumen and possibly the lymphatics is now widely thought to be more usual. Clinicians rightly emphasise that obstruction, trauma, and stasis predispose to bacterial invasion; but obstruction may sometimes be a sequel rather than a cause. Not much is known about the antibacterial mechanisms in the kidney, which is, however, especially vulnerable to *Escherichia coli*.[1] Nor is it clear how the bladder rids itself of bacteria, many of which multiply freely in a constant supply of growth-promoting urine. Moreover, we do not all mean the same thing when we speak of chronic pyelonephritis, while the semantic confusion between pyelitis and pyelonephritis persists despite the efforts of pathologists to treat the former as debased currency. A more urgent controversy concerns the possible late effects of acute urinary-tract infections. General practitioners see most of these as isolated episodes which respond rapidly and apparently completely to simple treatment, whereas many doctors in hospital regard them as sinister and liable to recur, and as requiring protracted treatment to reduce the risk of renal scarring.[2 3]

Surgically induced infections, such as those following the use of indwelling catheters, can often be avoided by special precautions.[4] Insertion of the potentially dangerous urethral catheter to obtain urine for bacteriological diagnosis is seldom justified, although still widely practised. On p. 1059 Dr. Brumfitt and his colleagues compare the prevalence of urinary infection in 105 healthy women at term who were not catheterised with that in 110 similar women catheterised once before delivery solely for the purposes of the investigation. Although they were dealing with small numbers, their results are striking: twice as many (10) women were infected in the catheterised group; and when catheterisation had to be done for obstetrical reasons 24 of 104 became infected although these were younger women, half of them primigravidæ. Not all obstetrical manœuvres carried the same risk: after forceps, breech extraction, and cæsarean section only 7 of 62 women became infected despite the inevitable trauma, whereas after catheterisation to reduce urinary retention 13 out of 32 patients were infected. These results resemble those of Davis et al.,[5] who found subsequent evidence of infection in 66 out of 186 women who had a catheter passed immediately before delivery. Passing a catheter before delivery may still be thought to be good obstetrical practice, but it clearly carries considerable risk for the patient.

Brumfitt et al. take as their criterion of infection the presence of 100,000 bacteria per ml. of uncentrifuged urine—a level at which pyuria was sometimes, but not always, present. Over the past few years Kass [6] has collected much epidemiological and other evidence that the arbitrary level of 100,000 bacteria per ml. indicates bacteriuria, and that this condition can be readily distinguished from contamination by simple bacterial counts on freshly voided mid-stream samples of urine. Kass believes that bacteriuria is a disease state; and, although it occurs in apparently healthy people, it is closely associated with, and often precedes, active pyelonephritis. Kass claims that in 6% of pregnant women bacteriuria may be present even before the second month, and that 40% of such women subsequently develop pyelonephritis. On p. 1062 of this issue Dr. Turner confirms Kass's claim. Dr. Turner found significant bacteriuria in 108 (7%) of 1500 unselected antenatal patients attending an Aberdeen clinic. The age of patients did not seem to affect the prevalence of bacteriuria, but Dr. Turner has confirmed the observation of Kaitz and Hodder [7] that the prevalence increases with the number of previous pregnancies. That 49 (60%) of 79 patients with bacteriuria subsequently developed clinical symptoms of urinary-tract infection, compared with only 1 of 64 controls without bacteriuria, is surely significant. Dr. Turner does not specifically mention pyelonephritis, but from the number and type of symptoms listed there seems no doubt of the predictive value of bacteriuria in selecting patients likely to develop clinical manifestations of urinary-tract infection.

While bacteriuria is certainly related to pyelonephritis, a kidney lesion may precede the bacteriuria, and there is some published evidence of impaired urinary concentrating ability in patients with symptomless bacteriuria. Kass has suggested that hormonal influences may be concerned in the persistence of bacteriuria in pregnant women, but the evidence for this is not very strong. Kass found—and his claim is supported by controlled trial—that no woman whose bacteriuria was eliminated throughout pregnancy developed pyelonephritis. Accordingly there may be a case for screening tests for bacteriuria as part of antenatal care. Dr. Turner has attempted to tackle some of the practical problems of screening in a large clinic. The preliminary cleansing of the vulva at present recommended before collecting mid-stream samples of urine is disliked by both patients and nurses; and if, as she suggests, this could be omitted, then the technique would be simpler and much more likely to be widely adopted. Unfortunately, there is no reliable chemical test for bacteriuria—the nitrite test is positive in about 80% of cases. Simple microscopical examination for bacteria and pus cells is not satisfactory, and quantitative bacterial counts are essential for the detection of bacteriuria. The difficulties in screening large numbers of patients are undoubtedly formidable, but can we afford to forgo this information? If Kass's claims about the value of treating bacteriuria are confirmed, then pyelonephritis of pregnancy is a preventable disease.

METASTATIC TUMOURS OF LIVER

IN its early stages metastatic cancer of the liver is often extremely difficult to detect. Fenster and Klatskin [8] remark that, although correct diagnosis may not alter the prognosis, it may avert unnecessary laparotomy. (On the other hand, exploration commonly discloses, besides secondary hepatic deposits, a primary tumour of the

1. Beeson, P. B., Rowley, D. *in* Biology of Pyelonephritis (edited by E. L. Quinn and E. H. Kass); p. 427. London, 1960.
2. Rosenheim, M. L. *in* Recent Advances in Renal Disease (edited by M. D. Milne); p. 137. London, 1961.
3. Garrod, L. P., Shooter, R. A., Curwen, M. P. *Brit. med. J.* 1954, ii, 1003.
4. Miller, A., Linton, K. B., Gillespie, W. A., Slade, N., Mitchell, J. P. *Lancet*, 1960, i, 310.
5. Davis, J. H., Rosenblum, J. M., Quilligan, E. J., Persky, L. *J. Urol.* 1959, **82**, 613.
6. Kass, E. H. *in* Biology of Pyleonephritis (edited by E. L. Quinn and E. H. Kass). London, 1960.
7. Kaitz, A. L., Hodder, E. W. *New Engl. J. Med.* 1961, **265**, 667.
8. Fenster, L. F., Klatskin, G. *Amer. J. Med.* 1961, **31**, 238.

stomach or colon which is resectable, and the patient may gain palliative benefit from removal of the primary tumour.) Their survey covered 81 patients in all of whom liver metastases were recognised as a result of needle biopsy, laparotomy, or necropsy. 54 had symptoms attributable to the liver, though these were in many cases overshadowed by symptoms from the primary growth. 29 complained of pain, often sharp and intermittent, in the right upper quadrant of the abdomen, and less commonly felt as a dragging sensation beneath the right costal margin. It was often aggravated by deep breathing and coughing, and was sometimes accompanied by a friction rub. Ascites was present in 25 and jaundice in 22; 6 patients had a mass which proved to be an enlarged liver. Obviously the disease was advanced in many of these cases; but the prevalence of pain regarded as referable to the liver is perhaps surprisingly high.

The initial needle biopsy of the liver was positive in 60 cases, and with second and third attempts in 63 cases. The main objections to needle biopsy are that it is not without risk to life, and that with so tiny a fragment of tissue obtained for histological study a false-negative result may be obtained. No deaths attributable to biopsy occurred in this series; but the test was not performed unless the clotting, bleeding, and prothrombin times were normal. Sherlock [9] considers the risk to be slight except when jaundice is present, but expects a positive result in only about 50% of cases where metastases are in fact present. Fisher and Faloon,[10] on the other hand, reported a mortality from biopsy of 12% in patients who had liver metastases, although the overall mortality was only 1·5%. Needle biopsy of the liver has been made safer and easier by the introduction of the Menghini needle,[11] with which the operation can be completed within one second.

Needle biopsy has not gained an established place in this country, except in research. In clinical practice laparotomy, although it carries an almost equal risk to life, is preferable because it gives a better chance of detecting deposits in the liver, and enables the possibility of resecting the primary neoplasm to be assessed.

VISUAL DISTURBANCES FOLLOWING VERTEBRAL ARTERIOGRAPHY

VERTEBRAL arteriography is an established procedure of great diagnostic value, but it still entails a certain element of risk despite improvement in contrast media and technique. The visual disturbances which may ensue have been well reviewed by Silverman et al.[12] who report nine episodes in eight patients of transient cerebral blindness resulting from the examination made by percutaneous puncture. In three of these patients blindness followed immediately after arteriography, and in the others it was detected one to fifteen hours later. Two patients became completely blind with absent light perception and blink response but with persisting active pupillary light response, and six had various degrees of amblyopia with perception of light and motion but not of form or colour; one patient had complete right homonymous hemianopia and left hemiamblyopia. Light and motion perception was recovered first and form and colour perception later; the central portion of the retinal field improved first. In some patients the findings varied during recovery, and hemiamblyopic and hemianopic fields were reversed. Double simultaneous stimulation, using small light beams and white coloured targets, might show gross differences in the two homonymous half-fields. The return of normal vision was usually claimed by the patient before the visual field had returned to normal; this claim was made as soon as one homonymous half-field had returned to normal even though the other was still defective. In five patients complete recovery with restoration of normal fields of vision occurred from two to ten days after arteriography; in the other three patients recovery of vision was incomplete, but these had all had pre-existing field defects. Mental changes, including severe loss of memory, confabulation, disorientation and visual hallucinations, may accompany the amblyopia. The hallucinations develop with greater frequency in patients with pre-existing bulbar signs and in those with raised intracranial pressure. Two of Silverman et al.'s patients had visual hallucinations and one had visual agnosia.

Hauge [13] studied the symptoms and signs following vertebral arteriography performed by radial catheterisation in a hundred and ten patients. Twenty-five experienced scintillations in one or both eyes lasting for up to fifteen minutes after the injection of contrast medium; nine had gross visual impairment, light perception being reduced to a grey fog in six. Visual agnosia occurred in five, and retarded perception of visual stimuli compared with auditory ones was noted at times. One patient later explained that she had had "to associate eyesight with hearing or with her unconscious conviction that an object ought to be there before she could see it". Hauge observed that visual disturbances usually followed the first injection of contrast medium and that bulbar symptoms usually followed a second injection.

Sugar and Bucy [14] suggested that the factor producing these complications is ischæmia resulting from a temporary fall in blood-pressure during angiography, and they counsel against undertaking vertebral arteriography directly after carotid arteriography in patients with homonymous hemianopia lest the communication between the carotid and basilar symptoms be imperilled. The presence of occlusive cerebrovascular disease naturally increases the risks of angiography.[15] Using the contrast medium in low concentration reduces the incidence of complications.[16] Slow flow of contrast medium through the cerebral vessels, which occurs with high intracranial pressure or arterial constriction (a common accompaniment of subarachnoid hæmorrhage from an aneurysm), increases the risk of complication.[17]

It seems that some 4–5% of patients submitted to vertebral arteriography, however it is performed, will develop visual complications. (The risk with carotid arteriography[18–20] is much less.) The prospect of recovery of vision is good provided that there has been no previous visual disturbance, that cerebral arteriosclerosis is absent, that reasonable quantities of contrast medium have been

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10. Fisher, C. J., Faloon, W. W. *Amer. J. Med.* 1958, **25**, 368.
11. Menghini, G. *Gastroenterology*, 1958, **35**, 190.
12. Silverman, S. M., Bergman, P. S., Bender, M. B. *Arch. Neurol.* 1961, **4**, 333.
13. Hauge, T. *Acta. radiol., Stockh.* 1954, suppl. 109.
14. Sugar, O., Bucy, P. S. *J. Neurosurg.* 1954, **11**, 607.
15. Rowbotham, G. E., Hay, R. K., Kirby, A. R., Tomlinson, B. E., Bousfield, M. E. *ibid.* 1953, **10**, 682. Rozanski, J. L. *Neurology*, 1952, **2**, 341.
16. Sjögren, S. E. *Acta. radiol., Stockh.* 1953, **40**, 113.
17. Kaplan, A. D., Walker, A. E. *Neurology*, 1954, **4**, 643.
18. Falls, H. F., Bassey, R. L., Lamberts, A. E. *Arch. Ophthal.* 1951, **45**, 613.
19. Walsh, F. B., Smith, G. W. *J. Neurosurg.* 1952, **9**, 517.
20. Frøvig, A. G., Koppang, K. *Acta. psychiat., Kbh.* 1953, **28**, 339.

used in low concentration, and that the intracerebral blood-flow is not grossly slowed by high intracranial pressure or gross arterial spasm.

HÆMOPTYSIS

A FEW decades ago pulmonary tuberculosis was a common cause of hæmoptysis, and carcinoma of the bronchus a relatively rare one. As late as 1946 in this country Heller [1] found that of 416 patients with a history of hæmoptysis only 10 (2·4%) had bronchial carcinoma; whereas Pursel and Lindskog [2] now report that of 105 consecutive patients with hæmoptysis who were admitted to a thoracic surgical centre at New Haven, Connecticut, no less than 20 (19%) had lung cancer. 133 (32%) of the first series had active tuberculosis, compared with only 14 (13%) of the second. While no two series of patients with hæmoptysis can be regarded as fully comparable, the trend here seems quite definite; and in men over 45 years of age hæmoptysis is likelier to be due to bronchial carcinoma than to anything else.

In each of these two reports the authors suggested that the severity of the hæmoptysis was of little significance in establishing the nature or extent of the underlying disease. Occasionally even massive hæmoptysis cannot be explained, and extensive pulmonary lesions can exist without ever giving rise to the spitting of blood. Nevertheless, as Johnston [3] pointed out, tuberculosis and bronchiectasis often give rise to a short sharp hæmorrhage, whereas with bronchial carcinoma, although bleeding may be severe, it consists characteristically in persistent or repeated staining of the sputum. Bronchiectasis is perhaps more liable than any other condition to give rise to recurrent large hæmoptyses—owing perhaps not only to chronic infection but also to the fact that the bronchial arteries are often grossly dilated and tortuous: the severity of the hæmorrhage in bronchiectasis may be related to the fact that the pressure in these arteries is that of the systemic, not the pulmonary, circulation.[4]

Pursel and Lindskog's series of 105 cases included 16 (15%) in which, despite intensive investigation, the cause of the hæmoptysis could not be elicited; only 4 of these coughed up less than 30 ml. of blood, and 1 was a massive bleeder. A follow-up of 14 of these patients revealed that all were living and none had bled again; in 1 severe virus pneumonia developed about four years later, but none of the others manifested further evidence of intrathoracic disease. Heller [1] and Douglas and Carr [5] also found that the prognosis was excellent in the absence of recurrent bleeding.

Not many patients with hæmoptysis require urgent bronchoscopy; but some do, in order to determine the source of the hæmorrhage. The risk of reactivating the bleeding by this procedure is not great. In the Connecticut series [2] 21 patients were bronchoscoped without incident " during active hæmorrhage "; and in 18 of these the source of the bleeding was recognised. Waterman,[6] too, observed no mortality in several hundred patients studied bronchoscopically during active bleeding. On the other hand there is no need to perform bronchoscopy at this stage if the source can be clearly identified by other means.

Finally, in the Connecticut series, cytological examination of the sputum for malignant cells yielded a positive result in 17 out of 20 patients with hæmoptysis from a bronchial carcinoma. Clearly the fact that a bleeding growth is likely to shed some of its cells is worth bearing in mind, especially when the tumour itself may not be visible radiologically or even bronchoscopically.

1. Heller, R. *Tubercle*, 1946, **26**, 70.
2. Pursel, S. E., Lindskog, G. E. *Amer. Rev. resp. Dis.* 1961, **84**, 329.
3. Johnston, R. V. *Tubercle*, 1959, **40**, 491.
4. Wood, D. A., Miller, M. *J. thorac. Surg.* 1938, **7**, 649.
5. Douglas, B. E., Carr, D. T. *J. Amer. med. Ass.* 1952, **150**, 764.
6. Waterman, D. H. *J. thorac. Surg.* 1955, **30**, 286.

HOMELESS FAMILIES

NEARLY two years ago, in a Fabian pamphlet,[1] Mrs. Audrey Harvey put forward the view that the most formidable lack in the Welfare State was cheap housing. People with small incomes and large families found it difficult to find anywhere to live, and, deprived of a home of their own, a family with problems only too easily becomes a problem family. When we commented on Mrs. Harvey's pamphlet [2] we were able to quote three incidents, taken at random from the daily press, of families who had come to grief. All three had young children; all three had inadequate makeshift accommodation. Today the situation is worse. Public-health departments all over the country report growing waiting-lists for council houses. In Llanelly,[3] for instance, it has increased from 765 in 1956 to 1430 this year. The London County Council's recent discussion with the Minister of Housing of their acute difficulties has, therefore, drawn attention to what is a national rather than a local need.

In London homeless families are given basic temporary accommodation in centres; some of these are converted poorhouses and most of them take only women and children. There is no temptation to linger. Last year 23 families a week became homeless; now it is 45, and the surplus of admissions over discharges has risen [4] from 5 families a week to 10. Without children it is usually possible for the parents to find accommodation, and as a result in October the number of children in the Council's care rose to a peak of 9029. The Council have appointed a committee of inquiry to investigate the underlying causes of this increase in homelessness; but its report cannot be expected for some time, and on Nov. 1 a deputation from the Council visited the Minister of Housing. In his maiden speech [5] as Minister, Dr. Charles Hill said that he had told the deputation that the Council had " the power, the resources, and the responsibility " to deal with the immediate problem, and that he realised that their long-term inquiry might show trends which would need objective study.

Perhaps inevitably, the causes seem different to those with different political sympathies—the Rent Act, the migration of industry to the south, the lack of differential rent schemes, the abolition of the " general need " housing subsidy, the number of stately office blocks rearing their concrete masses. It would, however, be a pity if partisan recriminations should hinder national remedies, and it is encouraging that in the debate on the Queen's Speech, with the approbation of both sides of the House, Mr. David James described 8 million houses in the next twenty years as the " most important social commitment of the day ".[6]

THE next session of the General Medical Council will open on Tuesday, Nov. 21, at 2.15 P.M., when Sir DAVID CAMPBELL, the president, will deliver an address. The Disciplinary Committee will sit on Wednesday, Nov. 22, at 10.30 A.M.

1. Harvey, A. Casualties of the Welfare State. London, 1960.
2. *Lancet*, 1960, i, 862.
3. *Western Mail*, Oct. 29, 1961.
4. *Times*, Oct. 27, 1961.
5. *Hansard*, House of Commons, Nov. 6, 1961, col. 660.
6. *ibid.* Oct. 31, 1961, col. 117.

From Words to Wards

3. THE PLANNING PROCESS

IAN M. LESLIE
O.B.E., Hon. A.R.I.B.A.
EDITOR, "THE BUILDER"

BEHIND every successful hospital there lies a partnership—a partnership between the client, the architect and his consultants, and the builder. And just as in every partnership the qualities of ability, integrity, foresight and good humour are those that make for success, so, in building up the team which initiates and puts through a modern hospital, search must be made for those same qualities in the various experts who shall prepare the brief for the architect and hold his hand during the long and complex process of turning an idea into what, almost, is a living organism.

Let it be said straightaway that no hospital can be better than the brief that is given to the architect. In some types of building the skilful designer can bring together the ideas and wishes of a vague client and present him with a building that delights beyond the wealth of Cathay. The design of a hospital is another matter entirely—it is analogous to a complicated scientific instrument to the construction of which many people are bringing their expertise, and the failure of one part may well mean that the hospital as a whole falls short in efficiency.

The Doctor and the Architect

In the preparation of the architect's brief for the design of a modern hospital, there are three essential elements—the doctor (and, for the purpose of this article, this includes the matron), the architect, and the administrator. There are other elements, but these are the key ones—the doctor who seeks the creation of a complex tool of his trade; the architect who makes it; and the administrator who keeps it oiled and in running order. How can the doctor and the architect best get together? How to establish a common language?

To make his most useful contribution, the doctor must understand the general planning organisation as well as the responsibility of the architect. He will, of course, be aware of the way in which a case for a new hospital is made to the Ministry of Health—a procedure which follows much the same form whether the case is for a new teaching hospital allied to a university, or for a general hospital which is sponsored by a regional hospital board. He will know that, granted the primary case is made out from the regional and local needs and a scheme approved in principle, the next step is to define the form which the new hospital should take, and that this will include a statement of the purpose, scope, and function of particular departments.

There seems a strong case for bringing in the architect at the stage when the case for the hospital's form is being made out. The really experienced architect can make a greater contribution to a scheme at this stage than at any later point, by using his planning skill to reconcile conflicting claims. For the average consultant tends to concentrate on those departments which essentially concern him, and enthusiasm must sometimes be curbed. What help can be given the architect in tackling this ticklish job? Before an answer can be given, we may perhaps briefly look at the organisations responsible for building a new teaching hospital and, comparable, a district general hospital initiated by a regional hospital board.

In England and Wales all hospitals, except those for teaching, are initiated by one or another of the 15 regional hospital boards. In Scotland all hospitals, teaching hospitals included, come under the five regional boards which in turn are responsible to the Department of Health; the relatively small number of major hospitals makes this chain of responsibility less cumbersome than might be feared.

Under each regional board are hospital management committees, managing groups of hospitals which may vary from one very large mental hospital to a group of 6 or 7 or more smaller units. These management committees are appointed by the regional boards. When a new hospital is proposed the regional board will appoint an ad-hoc committee comprising an administrator, the senior administrative medical officer (S.A.M.O.), and one of the board's senior architects, who will be supplemented by the consulting engineer for services, a quantity surveyor, and a nursing adviser. The planning team meet a similar team nominated by the hospital management committee concerned, the two teams forming an ad-hoc committee at officer level.

Rational in purpose though a committee of this size may seem, it does not invariably work smoothly *vis-à-vis* the architect. There is sometimes a lack of expertise which involves referring too many matters to the Ministry; even worse is the fact that the committee's personnel may so frequently change, and with it occur a re-direction of emphasis which can involve radical changes in plan. It may be that greater care should be taken to appoint members in the initial stages who will "stay put" for some years.

The First Task

After clarifying the form and function of the hospital the first task of this ad-hoc committee is to produce a schedule of accommodation (a job that looks simple enough when reduced to two or three foolscap pages but which may take weeks of hard work and involve much consultation between the S.A.M.O. and consultants). When Ministry approval has been given, the architect is then appointed; he may be on the staff of the regional board or in private practice. The architect prepares the sketch plans for submission to the Ministry of Health; and if these are approved both as to design and cost, he will prepare working drawings and details to enable the scheme to go to tender, in whatever annual programme the Ministry sanctions. The process, it will be seen, is not either easy or quick; it may be at least seven or eight years from the point of initiation before a major hospital opens its wards.

The Private Architect's Contribution

The contribution which the architect in private practice can make in the field of hospital design is very great—and this may be true not only of those in firms which have specialised in this type of work. The value of the private practitioner in contributing fresh ideas and in avoiding the weaknesses which come from too much inbreeding was candidly acknowledged to the author recently by Mr. R. F. M. Mellor, chief architect to the South West Metropolitan Regional Hospital Board [1]:

"So far the Hospital Service, admittedly in its infancy, has not of its own volition produced many outstanding buildings," he said, "and the spirit of friendly competition introduced when some of the schemes are put out to private architects is all to the good. I do not think that the private men engaged need necessarily be hospital specialists; as in every building project it is the quality and vision of the man that counts. After

1. Personal communication.

all, the regional architects and their staff are always available to give guidance if required. In my region about 70% of all hospital work is being designed by staff architects and 30% by private practitioners. We should remember that no building of any quality was ever planned by a committee, and that the architect's job is to be the planning adviser to the committee, whose principal job is to decide schedules of accommodation and to channel information to the architect."

But, however the architect is appointed, his appearance on the scene is prefaced by the setting up of a building committee. This may be of much the same composition as the ad-hoc committee except that the architect now formally joins it. It is the job of the A.M.O. on the committee to pass on to the architect the necessary planning data for the design of various departments, and this he will obtain from his colleagues and the nursing staff. These data may be supplemented by the architect himself, one of whose professional duties is to keep himself *au courant* with the latest developments in medical science, which he will normally do by visits to other new hospitals at home and abroad, and through symposia and lectures organised by the Royal Institute of British Architects. The contribution which the architect thus makes is invaluable, for it may be one of the weaknesses of regional building committees that the A.M.O. responsible for supplying information on consultants' needs is not attached to any particular hospital, and himself does no clinical work.

The "Hospital Building Notes"

A further source of information lies to the hand of the architect and building committee in the shape of the series of *Hospital Building Notes* issued by the Ministry of Health. The aim of these notes is to bring into one manual the latest views and the best current practice in the planning of hospitals and special departments of hospitals. They owe their inception to Mr. W. E. Tatton Brown, A.R.I.B.A., the Ministry's chief architect, and fulfil a double role of giving initial guidance to building committees and of establishing a standard by which schemes may be measured. Each *Building Note*, before it has appeared, has been submitted in draft to every regional board for comment (though curiously enough not to architects in private practice—curiously, because of the wealth of experience possessed by some of the practices steeped in the problems of hospital planning), and as such can be taken as representing an average of current design ideas.

Since, however, the written and printed word must inevitably lag behind the innovator, these *Notes* will require interpretation and constant revision; otherwise instead of aiding the architect and his building committee, they could (in the hands of the too literally minded) become shackles on progressive design. The danger has been pointed out recently in the following terms [2]:

"The fact that the hospital is a complex of departments which have their own specific requirements but which must be correlated into one whole, with a view to the whole being constantly kept in mind, raises problems different from those met with in other fields of design. . . . Detailed studies (such as the Ministry of Health Building Notes) are necessarily long in preparation, and can be quickly outmoded. The changing pattern of departmental needs demands a rapid assessment of current trends and anticipation of the future in concise terms. . . . It is important that Building Notes should be frequently brought up to date and that they should be refined by studies of completed hospital buildings."

It is fair to say that the Architects' branch of the Ministry of Health is aware of this defect inevitably inherent in the *Notes* and has plans for revision. In any case, the Ministry is in the position of having the last word on all new hospital design and is ready and willing to discuss ideas which differ from the present norm.

2. *Builder*, May 26, 1961, p. 1001.

The Teaching Hospital

The position of a teaching hospital in England and Wales differs in some important respects from that of the general hospital which comes under a regional board. To begin with, the client is the board of governors which, while liaising with the university with which it is associated through its medical school, is directly responsible to the Ministry of Health, though it will have to satisfy the University Grants Committee in respect of the plans of any section of the new hospital for which that committee is giving grant aid.

The governors of a hospital contemplating building or re-building will set up a building committee to make a case to the Ministry and, that case being made out, will prepare a schedule of accommodation, appoint an architect, and make a second case for the form which the new hospital should take. By reason of the autonomy which the teaching hospital enjoys, there seems to be no set pattern taken by the building committee, or working party as it is sometimes called. Essentially, however, the committee will comprise administrators, technical consultants, and representatives of the medical and surgical services who will use the hospital, and the convener and secretary will be a senior administrative officer. This plan has been followed by, among others, Addenbrooke's Hospital in Cambridge, where a basic planning team was set up from the start to work with Mr. S. E. T. Cusdin, the architect, and by St. Thomas's Hospital. Any project of more than 200 beds is sufficiently large to merit such a planning team, and it should be a matter of principle that the appointed architect should be associated with that team from the very beginning.

Rebuilding St. Thomas's

The set-up of the building committee responsible for the new St. Thomas's at the Surrey end of Westminster Bridge is worth outlining in some detail.

This hospital is probably unique among teaching hospitals in having appointed its architect (Mr. W. F. Howitt, A.R.I.B.A.) full-time. The committee's purpose is to give the architect guidance as required and to be responsible for fact-finding. It is responsible to the board of governors, to which it reports periodically, and it has channels by which it can obtain specialist advice not otherwise available. In doing so, it has to steer a course between the *laissez-faire* of the stick-in-the-muds and the freely proffered advice of the crack-pots.

Composition of the building committee is as follows: (1) chairman (who is also chairman of the board of governors), (2) a vice-chairman (also chairman of the general purposes committee), (3) the chairman of the finance committee, (4) the chairman of the medical committee (a consultant); (5) the dean of the medical school; and (6) the chairman of the medical advisory panel. The chief administrative officer (clerk to the governors) and the matron are in attendance, the latter to outline nursing needs, also the deputy clerk who acts as secretary and is also secretary to the medical advisory panel. This panel performs a vital function: 9 in number, it represents about 70 specialists in various sides of the hospital's medical and surgical work. Through its chairman, an answer to any particular problem affecting medical or surgical needs can be obtained; it meets monthly, or as required.

The building committee calls upon the architect, the consulting mechanical engineer, and the chief administrative officer (the clerk of the governors) as required, and also on any member of the medical advisory panel as needed for advice on a particular problem.

The committee's task is complex, for the teaching hospital has three functions: (*a*) to provide accommodation for teaching; (*b*) to provide patient accommodation so that students (not only medical and surgical but radiographers, nurses, and all who learn and all who teach) may gain experience; and (*c*) to provide a place for research in medical and academic sciences—the whole of this against the background of an overall efficiency necessary to a hospital which shall aim to lead the field, not least in the attention given to care of patients. These three functions raise problems of siting as well as of planning which add to complications. At St. Thomas's the building committee, though relatively small, is found in practice to cover the field well, and to give the scheme the benefit of the best (while avoiding the worst) features of the committee system. In hospital work the architect's ideal—the committee of one—is " out "; no one man can possibly be expert in all the complex needs of medical consultants.

Counting the Cost

Even the most single-minded enthusiast among medical consultants must eventually come to accept that hospital buildings must have a cost-limit, and will therefore take an active interest in ways and means of reducing cost. The Ministry of Health, following the example of the Ministry of Education in school building, sets cost targets which are of assistance in achieving overall economy. But hospitals vary so much in type and scale that they are less susceptible to unit costing than are buildings for educational use. Moreover, their purpose requires that construction should be such as to make necessary the absolute minimum of maintenance. Here the medical members of building committees should pay full attention to the views of the architect, the mechanical services consultant, and the quantity surveyor who nowadays is fully competent to advise on the merits of varying structural systems.

Research on the cost of structural systems, and on standardisation of building components, begun by the Nuffield Foundation under R. Llewelyn Davies, is now being continued by the Building Research Station in conjunction with the architects' branch of the Ministry of Health, and it may well be that developments may be expected on the lines of the CLASP system for schools [3] though for reasons already mentioned it would be unwise to expect comparable savings within the hospital programme. It is interesting to note that the architects of the four Metropolitan regional hospital boards are investigating the possibility of setting up, subject to the consent of their boards, an independent research programme whose findings might well contribute something both to speed of building and to reduction of cost.

Placing the Contract

When it comes to placing the building contract, the building committee should rely for advice upon its architect. No hospital now falls for the discredited method of " open " tendering by which the job is thrown open to all and sundry, and decided on price irrespective of merit.

The principle of " public accountability " must nevertheless be preserved, and this can be done by several methods. The first is to invite tenders from a comparatively small number of firms recommended by the architect as being of equal ability and standing; another (a system which may well gain ground under current conditions) is that proposed by Addenbrooke's Hospital committee, which has prepared its building scheme on the " parallel system " and will invite certain selected contractors to compete on the basis of pricing competitively a schedule of prices. By " parallel " working is meant that the processes of preparing working drawings and bills of quantities (and sometimes site preparation) proceed simultaneously with the pricing of the schedules, thus saving considerable time and enabling the building contractor to have representation on the building committee. It is hoped by this procedure to cut the estimated time from the point when the basic planning has been settled to the completion of the hospital from about 13 years to 7. This Cambridge proposal is now being considered by the Ministry of Health.

But whatever method of placing the contract is used, medical members of the committee (who, after maybe several years of striving and arguing, see themselves poised for the penultimate step of construction) should restrain themselves from expecting to see work start on the site a week after the contract is signed. A major building work, like a major operation, takes time to prepare for adequately, and such time well spent (it may be six months or more) is reflected in good building and an early finishing date.

Summing-up

To sum up, it is always to be remembered that the doctor and the architect are sworn allies in the process by which an efficient hospital comes into being, and that the efficient hospital can come only through the quality of the architect appointed, the validity of the advice offered him in the form of the initial brief and afterwards, and informed support during the execution of the contract.

I wish to acknowledge with gratitude factual data made available by Mr. R. F. Mellor, F.R.I.B.A. (architect to the South West Metropolitan Regional Hospital Board) and by Mr. B. East, A.R.I.B.A., his deputy; by Mr. S. E. T. Cusdin, O.B.E., F.R.I.B.A. (Easton & Robertson, Cusdin, Preston & Smith); and by Mr. W. A. A. Pearson, F.H.A., deputy clerk to the governors of St. Thomas's, and Mr. W. F. Howitt, A.R.I.B.A., architect to the hospital. Opinions expressed in the article are my own.

3. CLASP (Consortium of Local Authorities Special Projects) is both a structural system based on modular prefabrication of structural units for schools (developed by the Nottingham County Council's architect's department) and a method of bulk ordering of components by a number of county councils, which has brought down the cost of schools in those areas by about 8%, and building time by 6 months.

Special Articles

THE REHABILITATION OF SCHIZOPHRENICS

J. A. R. BICKFORD
M.R.C.S., D.P.M.
PHYSICIAN-SUPERINTENDENT, DE LA POLE HOSPITAL, WILLERBY, HULL

THE schizophrenic who has been in hospital for several years poses many problems. His illness may be refractory to all treatment; it may improve and then return in full force; or after initial improvement it may fail to show any further change for the better. After discharge, the patient who was apparently well in hospital may relapse rapidly, he may remain well provided he does not go back to work, or he may be incapable of successfully holding any employment, although appearing pretty well from ordinary points of view. Because the disease in these patients cannot be cured as yet by physical or chemical means, one can only try psychological methods to solve their problems. Traditional occupational therapy is of limited value, and emphasis is now being laid on occupations resembling the jobs which the patient may find after he leaves hospital.

The patient can enjoy this work, and he and his family both potentially benefit from his earning money, but such work has dangers, churlish as it must seem to draw attention to them:

It is difficult to reproduce in hospital the jobs that patients are likely to find out of it. Because many tasks are simple and monotonous, more so even than the worst kind of occupational therapy, the patients tend to lapse into an automatic state while still carrying out the task, continuing to ruminate and hallucinate as freely as before. An occupation to be therapeutic must always stimulate. It might well be argued that even simple repetitive tasks have some intrinsic value; and so they have, provided the patient is not kept at any given one for long. Ideally the tasks should be so varied and graded that as week succeeds week the patient is faced with more and more difficult problems. But in practice this does not usually happen; the patient becomes recognised as a putter-on of pink paint, the screwer-in of a small piece, or a stamper-out of bottle tops, and these things he continues to do morning and afternoon, week after week, and even year after year. It would be wrong to say that no effort is made to get such a patient out of hospital, but there is a tendency not to worry about him too much once he is working well in " the hospital factory ".

This is because a good idea is ill used. A hospital factory has become respectable. A hospital has to have one in the same way that in the past it had to have an insulin-coma unit or an occupational therapy centre; but the important thing is not having the department but what use is made of it. There is a risk that, once the factory is fully staffed by patients working reasonably well, the psychiatrist will be satisfied because he misunderstands the purpose. In some hospital factories patients are being as steadily " institutionalised " as they were in the tailor's shop and laundries of yesterday. The hard-pressed psychiatrist's difficulty in overcoming his own particular moment of inertia is partly responsible. Another reason, regrettably, is that if a contract with a firm has been made, and then the patients are changed or discharged, that contract will not easily be fulfilled. Despite these criticisms, a patient in such a factory will derive benefit; but, since the task does not approximate to that normally found in factories outside, he often becomes not so much adapted for the outside world as better adapted and more reconciled to hospital life because he finds the change agreeable and he receives some financial reward.

What the patient requires, however, is to be slid gradually from work in the hospital to work outside. The stages by which he is made fit will take a very long time, and in the early stages of treatment it is advisable not to think too much of profit-making. The skill a long-stay patient requires before seeking work out of hospital (with any prospect of holding it) is predominantly social. He must get used to travelling on buses, going to an ordinary place of work, and mixing with healthy men and women not only on the shop-floor but also in the canteen and corridors. The ability to do this may be one the chronic schizophrenic cannot acquire independently.

In my view the most useful activity is one which helps the patient to acquire the social abilities which will enable him later to join in ordinary factory life. There are many ways of doing this, but at De la Pole Hospital we set about it as follows.

METHOD OF REHABILITATION

The patient who has long been in hospital, cared for by good nurses, makes his nurses his friends, learns to trust them, and, like a soldier with his officers, will follow them on fresh pursuits, knowing that nothing need be feared; all he has to do is go with them.

The same nurse who looks after a group of patients in hospital also takes them to some outside job, in the fields or in the factory. The employer tells the nurse what has to be done, and the nurse tells the patients and helps them to do the task properly. He acts as liaison officer; he interprets one side to another; he allays fears and softens hard words; he protects the patients from unkindness; he sees that they conduct themselves properly; and he chats to the fellow employees, explaining things to them and enlisting their interest and sympathy. When a patient begins to look more confident, the nurse withdraws from him but still observes him and helps if necessary. Many nurses do these things well; but the task is not easy, calling for tact, leadership, and deep interest if the patients are to be gradually " eased " into a working life outside hospital.

Where the patients are far from well potato picking, pea pulling, or the like are invaluable in the first place. The patient leaves hospital, visits fresh country, mixes with ordinary people, sees the immediate result of his actions, and gets paid according to the regulations; and because the work is seasonal it cannot go on too long. Threshing or carrot thinning is a suitable next step, or perhaps clearing brushwood away, or picking up scrap metal and bricks from old Army sites.

As the patient becomes more able to conduct himself properly in public other jobs suggest themselves; a large overgrown garden can be restored to order by ten patients and a nurse, a new garden may need digging and clearing of rubbish, or handbills can be distributed by groups of patients. Much skill is needed by the nurses who go to see that these things are done properly; the improvement is gradual, and all the time they must carefully and unobtrusively watch the patients, and gradually permit them to work more on their own.

A firm willing to take on a group of patients is only too pleased to accept the presence of a nurse to help them. Eventually the nurse can be withdrawn, or the patients can be moved to other departments where they come directly under the firm's employees. Though usually refusing to guarantee permanent employment to patients, firms will almost always take on an appreciable number when they see their response and how well they work. To stimulate interest it is wise to have several different jobs going at the same time so that patients can move from one to another, and I think it is essential to avoid being fully committed to any one firm (whether in hospital factory work or outside employment). Circumstances may change; as the patients improve they are able to do more skilled tasks, and to keep them to simple ones because of a contract is a great mistake. " Plasticity " and " non-commitment " are essential.

A scheme has already been described [1] whereby two hospitals exchanged equal numbers of patients, enabling many long-stay patients to have a holiday at very little expense. This scheme has proved extendable.

For a number of years male patients from De la Pole Hospital have been employed in tidying up a local racecourse; they also watch the races, take a picnic lunch, and are paid. For the past two years a famous south-country racecourse has similarly employed a number of De la Pole patients during its meetings, and a nearby hospital accepts them on an exchange basis. This party comprises thirty-five patients and five nurses: on each day of the race meeting about half go to the course, pick up paper before and/or after the day's racing, and watch the races, whilst the others have a day off. The racecourse authorities make provision for shelter and see that the party have a good place to watch the races. During each excursion they have been visited by a doctor from their own hospital. The friendly reception of the racecourse workers, stallholders, and bookmakers, and the public has been most striking. The patients enjoy going, it is good for them, and their relations are pleased. They do no-one harm by taking on the job because it is unpopular and the quality of the usual applicants is poor. That the patients do the work quickly and well is due to the very superior qualities of

1. Bickford, J. A. R., Miller, H. J. B. *Lancet*, 1959, i, 96.

the nurses who go to guide and look after them. But the visit is not all work, because, as well as the days off, the guest hospital provides excursions and entertainments.

Other extensions to this scheme easily come to mind. How pleasant it would be to visit the hop fields of Kent, the orchards of Worcestershire or the raspberry fields of Scotland. Nothing more is required than friendly relations between two hospitals, and nurses with integrity. If the nurses regard the scheme as an outing, and do not encourage the patients to work, then it becomes a waste of time, bringing nothing but discredit to the hospital and disillusionment to the employer.

EARNINGS

The payment of patients on these outside tasks is made unnecessarily complex by the regulations:

When the patients first go out to work they are not fit, and it takes about three to do one normal person's work. Where possible, therefore, as in certain agricultural work, payment is best made for the work done rather than for the number of hours worked. The contract is between the Hospital Management Committee and the employer; after deductions have been made for travel, board, &c., the money is divided between the patients.

A man regarded as sick can receive £2 a week without losing any of his sickness benefit, but he loses this if he gets more than £2, and if he is in hospital he has to make a contribution for his board and lodging. Therefore, unless he can earn more than £5 a week (which is not very likely at first), he is not appreciably better off than he is with £2. Moreover, if the patients in groups are earning more than £2, they are classified as self-employed, and consequently their deductions for insurance are more than they would be. This is unfair, and one incentive is gone. Moreover, by making it uneconomic for patients to earn £3 or £4 a week the Treasury is deprived of income.

The patient compulsorily detained for treatment may be too ill to be allowed to leave hospital; and yet with some restraint he may be able to work and earn enough to make a contribution to his own treatment and to help support his family. He may be able to graduate from work in a group with a nurse, to general supervision by a nurse, and then to work in a firm without a nurse permanently present. The present lodging allowances need modification for those who earn small incomes, although abuses exist. Patients go out to work from some hospitals where they lodge even though they are capable of paying for decent lodgings outside. There is a case for steeply increasing the maximum for lodgings as the weekly wage goes up; there should be no excuse for a " patient " going out to work from hospital in his own car.

CONCLUSION

I have tried to suggest ways in which the state of the apparently incurable schizophrenic can be favourably influenced. Nothing is more difficult than the successful resettlement in employment of the long-stay patient, and this task demonstrates to the full the great demands which can be made upon psychiatric nurses—probably the most difficult to be made upon any nurse. The psychiatric nurse today indeed " nurses " his patient back to health and life, and perhaps he has never done so much before on his own responsibility.

Occasional Survey

VISCERAL PAIN

PAIN is still a problem, both physiologically and philosophically. Much work has been done on cutaneous and muscle afferent fibres; the sense endings are reasonably accessible, the nerve-fibres are abundant, and, as far as cutaneous sensation is concerned, the appropriate stimulus can be guessed. It is otherwise with visceral sensation. We all know that visceral activity can give rise to satisfaction or distress, but it is another matter to discover what causes these sensations, where the nerve-ends lie, and what paths the nerve-fibres take. It is also common knowledge that visceral disorder may give rise to referred pain. One of the older problems, now settled, was whether true visceral pain existed, or whether all the sensations perceived arose from endings in the parietal and visceral peritoneum—a tissue known to be pain-sensitive. The doubt about true visceral pain arose from the observation that, provided the serous coat was not tied or pinched, the viscera could be cut or burned without producing pain. However, these stimuli are inappropriate for viscera, and it was shown by Hurst [1] that tension and contraction could arouse true visceral sensation and pain. Rapid distension of any hollow viscus can evoke pain; slow distension to the same volume may give rise to no sensation at all.

Analysis of pain is difficult because pain is composed of several parts: there is the reflex response to noxious stimuli, and this may be multiple; perception of sensation; and emotional reaction. An experimental analysis of pain made by studying the reflex response to some presumably painful stimulus may lead to erroneous conclusions. Sweet [2] records the case of a patient with cordotomy who withdrew his foot when he trod on a nail, yet at the time he perceived no pain. Thus a reflex response does not necessarily denote that the stimulus causing it gave rise to pain. The point is less dramatically made by the cutaneous vasoconstriction which follows non-painful distension of viscera in man.[3] The emotional element can also cause difficulties since a situation which produces emotional tension similar to that which resulted from pain can, in turn, give rise to the belief that the once-associated pain is again present—that is, a conditioned response occurs.

By modern techniques it is possible to record the passage of impulses along fine nerve strands or even single nerve-fibres, whose diameter ranges from 22 to 0·5 μ (for comparison it is worth remembering that a red blood-cell is approximately 7 μ in diameter). Pain fibres are amongst the smallest. In outline the technique is as follows:

The nerve is microdissected until one or perhaps two active fibres remain. The area from which the nerve strand arises is then tested with various stimuli until one or more is found which activates the nerve from which the record is being taken. Thereafter the site of stimulation is carefully noted, and if possible the stimulus found to which the nerve is most sensitive. Finally, the locality may be examined histologically to determine the type of nerve-ending present, whether specialised or not. The rate of conduction of the impulse in the fibre is a reliable guide to its size; large fibres conduct more rapidly than fine ones. Consideration of all the information collected gives some idea whether the fibre studied may be related to pain conduction.

Studies such as those of Wolf and Wolff [4] on their subject with a gastric fistula fill in another part of the picture. In recordings from nerve-fibres electrical activity was first studied in fine strands of mesenteric nerves containing several fibres.[5] Pinching the intestine or mesentery was

1. Hurst, A. F. The Sensibility of the Alimentary Canal. London, 1911.
2. Sweet, W. H. Handbook of Physiology: Neurophysiology I; chap. 19. Washington, 1959.
3. Whitteridge, D. Lectures on the Scientific Basis of Medicine; vol. 4. London, 1954.
4. Wolf, S., Wolff, H. G. Human Gastric Function. London, 1943.
5. Gernandt, B., Zotterman, Y. *Acta physiol. scand.* 1946, **12**, 56.

found to give rise to impulses with the characteristics of those that pass along fine C and delta fibres. These two types of fibre—one non-myelinated and the other myelinated—almost certainly carry skin pain, and since they occur in visceral nerves may also carry visceral pain. No impulses were generated in these particular nerves by pressure or touch.

Study of the fibres has shown the presence in the gastrointestinal tract of distension-sensitive receptors, which are probably tension receptors in series with the muscle-cells. They are excited to great activity by rapid distension, and slow distension causes fewer bursts of impulses to pass along the nerve.[6] These tension receptors adapt—that is, if the distension is maintained, the rate of discharge along the nerve declines. This may be due partly to the slow relaxation in smooth muscle which is less than maximally stretched. These same sense endings can be activated by causing the muscle to contract isometrically by preventing the organ from emptying. The endings are found in the œsophagus, stomach, and intestine of cats; and the fibres run centrally with the mesenteric plexus and vagus nerves. These receptors may subserve the sensation of pain for colicky contraction and sudden distension. Other centripetal fibres travelling with the vagus arise from the mucous surface of the stomach. Some of these respond to stretch and distension, others are insensitive to distension [7]; many respond to various substances, including acid or alkali.[8 9] The acid-sensitive receptors may be part of a reflex system regulating gastric motility, at least in the sheep.[10] The function of the alkali-sensitive receptors is at present unimaginable. Whether stimulation of these endings can give rise to pain is open to question, though conceivably the acid-sensitive endings, especially in the area of inflammation surrounding an ulcer, could do so. It is even possible that these endings can give rise to pain from an uninflamed mucosa; for instance, in a patient with hyperacidity, pain disappeared when the acidity of the gastric contents was reduced by a little and the pH was raised to 2·0.[11] This is just about the threshold pH at which the acid-receptors begin to fire.

There are, then, many known types of receptors in the viscera, and probably others about which we know nothing. Many of the receptors may never induce pain nor any sensation which reaches consciousness. Their function is to regulate and coordinate visceral activities and to determine modifications in somatic circulation. How, then, can pain arise? There are various possibilities. For instance, there may be nerves which, by existing methods of examination, resemble each other in the character of their fibres and endings but which, nevertheless, have different thresholds of response. Thus, the more sensitive would respond easily to stimuli which lie in the normal range, and any effects of their activity would not reach consciousness. The less sensitive endings would only respond to stimuli beyond the normal range; and the resulting increased barrage of impulses could break through, or irradiate, into the sensorium. In the presence of inflammation the threshold for stimulation is lowered,[12] so awareness would then occur with weaker stimulation. Since awareness of viscera is an abnormal state, apart from such states as hunger or a full bladder or rectum, the unusual sensation is interpreted as discomfort or pain, according to the strength of the stimulus. Any tension or friction of the sensitive peritoneum would add to the number of abnormal impulses. There is no evidence that a violent stimulus applied to a specific nerve ending ever gives rise to a sensation other than the specific one—in other words, pure pain does not result.

The number of sensory fibres arising in the viscera is fewer than from the skin and muscles, and localisation is correspondingly more difficult; in addition, the cerebral cortical area of representation for the viscera is small. This is probably the basic fact underlying that misinterpretation known as reference of pain. Mackenzie believed that the viscera had no true pain fibres, but that the visceral afferents on being stimulated excited a focus in a definite segment of the spinal cord. If the impulses were strong or numerous enough the focus became hyperirritable. Normal impulses from the skin reaching the irritated focus then induced a greater than normal activity. Since cutaneous nerves were by far the more common, experience of the meaning of their activity was greater, and the weak visceral afferent stimuli were interpreted as arising from the more familiar cutaneous region. More recently it was postulated that one sensory fibre could split into two divergent branches one of which would innervate a superficial structure and one a deep structure. Pain in one branch could give rise to a feeling of pain in the area of the other, somewhat after the manner of a giant axon reflex.[13] In amphibia and fishes such an anatomical arrangement does occur, but in warm-blooded animals and man the evidence for it is slender. Nor does experiment support the hypothesis. If one finger is held in ice-water the pain may ultimately spread to the neighbouring fingers. If the experiment is repeated after infiltration of local anæsthetic into the neighbouring fingers the pain still spreads to them.[14] It is difficult to explain this observation on the basis of an antidromic (axon) reflex. It is simpler to believe that central convergence occurs.

Weiss and Davis [15] argued that, if local anæsthesia of the skin could completely relieve visceral pain, then there could not be any true visceral pain-fibres. In the event they found that infiltration could sometimes wholly and sometimes parly relieve pain of visceral origin. The pain they studied was due either to disease such as angina, or to inflation of balloons in the œsophagus or duodenum. The relief of pain was roughly contemporaneous with the duration of anæsthesia. Sometimes a vague soreness persisted even after infiltration, and if the pain was severe it might be referred to areas contiguous with that which was anæsthetised. Pain returned to the original site as anæsthesia diminished. Even during the period when pain was absent it was clear, in some cases, that the diseased site was initiating impulses—for instance, vomiting persisted. Weiss and Davis believed that unless pain was very severe anæsthesia of the area of reference always gave relief, and that the relationship between skin sensation and visceral function was reversible. Lewis [16] and others were not equally successful, and Lewis described a case in which infiltration of the contralateral groin relieved the pain of renal colic as effectively as infiltration of the side on which the pain was felt. Lewis stated that impulses reaching the sensorium from the viscera were interpreted as pain, that the pain was referred to the segment in default of sharper localisation, and that the wide spread of refer-

6. Iggo, A. *Quart. J. exp. Physiol.* 1957. **42**, 130.
7. Paintal, A. J. *J. Physiol.* 1957, **139**, 353.
8. Paintal, A. J. *ibid.* 1954. **126**, 255, 271.
9. Iggo, A. *Quart. J. exp. Physiol.* 1957, **42**, 398.
10. Titchen, D. A. *J. Physiol.* 1953. **122**, 32P.
11. Card, W. I. Cited by A. Iggo *in* Assessment of Pain in Man and Animals (edited by C. A. Keele). UFAW, London (in the press).
12. Walsh, E. G. Physiology of the Nervous System. London, 1957.
13. Sinclair, D. C., Weddell, G., Feindel, W. H. *Brain*, 1948, **71**, 184.
14. Wolf, S., Hardy, J. D. *Physiol. Rev.* 1947, **27**, 167.
15. Weiss, S., Davis, D. *Amer. J. med. Sci.* 1928, **176**, 517.
16. Lewis, T. Pain. New York, 1942.

ence areas in severe pain was entirely of central origin. Thus Lewis differed from Mackenzie in recognising that true pain fibres arose in and near the viscera and believing that confusion as to the source of the pain arose in the highest parts of the central nervous system.

Convergence to a common central pool is certainly the best way of accounting for the features of referred pain with its associated deep tenderness and muscular rigidity. There is anatomical evidence that sensory paths from the viscera and soma do converge, both in the spinal cord and higher. The visceral afferent fibres, including the fine myelinated and non-myelinated nerve-fibres thought to carry pain, run with one or other part of the autonomic nervous system to enter the dorsal roots. Thence some of the visceral fibres pass up on the same side in the posterolateral columns of the spinal cord and relay to the opposite side of the thalamus in close association with somatic sensory fibres. From there some relay again to the cerebral cortex. Other visceral fibres, which are possibly the pain carriers, on leaving the posterior roots cross over almost immediately in the cord and travel up in the anterolateral columns to the thalamus. There they meet once more the fibres that travelled in the posterolateral columns, and those from the body surface and muscles.[17] In addition, the afferent fibres entering the spinal cord from the posterior roots connect with internuncial neurones which course up and down the cord, thus linking several segments. Without doubt, then, somatic and visceral sensory fibres meet in the thalamus and may also have indirect connections in the spinal cord.

It is, therefore, understandable that skin and muscles are affected by visceral events. Owing to the internuncial links between segments, the pathway exists whereby a stimulus may spread beyond its own segment. In addition there must be other indirect sensory paths, since a strong stimulus applied in an area which is analgesic owing to cordotomy can be appreciated as a mild pain which may be referred to various sites. In this instance it would seem that impulses travelling an indirect route are incorrectly referred as though they had taken the customary path.[2] Satisfying evidence for convergence comes from the work of Macleod.[18] He recorded impulses which arrived in individual thalamic neurones and explored likely areas of viscera and skin until he found paired sites both of which fired the thalamic neurone. Further, he showed that after the central neurone had been excited from one source it was for a time inexcitable by stimuli arising from the other source—that is, he demonstrated occlusion. This is good evidence that one and the same cell was responding to impulses from both areas. Pain can be appreciated when it reaches the thalamus, but its full effect appears only if the impulses reach the cerebral cortex and thus allow the emotional reaction to develop.

In summary, sensory fibres arise from the viscera and their coverings and from the internal surface of the abdominal wall. Some of these fibres have the same characteristics as the cutaneous pain fibres. The information which can be conveyed is varied; the threshold to stimulation is reduced by inflammation. Pressure and stretch are conveyed from parietal and visceral peritoneum, contraction and distension from the muscles of the hollow viscera; from the mucosa arise other nerves which respond to changes in pH on either the acid or alkaline side of neutrality, to touch and pressure, and to various endogenous and exogenous chemicals. Because a nerve can be experimentally fired by a certain stimulus, this does not necessarily mean that that stimulus is specific and functional. There is the possibility that the natural stimulus has not been found, or that the nerve can respond to more than one kind of stimulus; for instance, many nerves respond to pressure or rubbing, and all are stimulated by hypertonic solutions. Normally the various impulses do not reach consciousness except in a vague way—a feeling of emptiness before a meal, a feeling of comfortable satisfaction after a good one, though this is in part psychological. The normal function of the sensory nerves is to coordinate reflexly the many visceral activities. In disordered states the impulses may be more numerous and vigorous than usual and a number of additional less sensitive pathways may come into use. Owing to the central link with sensory fibres arising from muscles and the body surface and the relative paucity of visceral fibres, the arriving visceral impulses may be referred to the surface in the same or neighbouring segments. Nevertheless it is often possible to recognise that the origin of a pain is internal and that the superficial pain and tenderness are secondary—that is, a feeble ability for localisation does exist.

It must be remembered that sensory fibres are all of the same class no matter whence they come; there is no basic difference between those arising from the surface and those arising from the viscera. The difficulty and confusion arise largely because we are not as familiar with our viscera as we are with the body-surface.

17. Macleod, J. G. *Aust. N.Z. J. Surg.* 1961, **30**, 298.
18. Macleod, J. G. *J. Physiol.* 1958, **140**, 462.

Medicine and the Law

Competence and Mischance

A FIVE-YEAR-OLD child was operated on in Ireland for the rectification of a squint, but without great improvement. At nine he still had quite a bad squint and was advised by a consultant at Westminster Hospital, London, to have a further operation for its cosmetic improvement.

In the course of that operation the surgeon, who was employed at the Westminster Hospital, when cutting the medial rectus muscle cut into the sclera, the choroid, and may even have cut into the retina. The prime object of the operation was not to cut the sclera, and the surgeon had cut something that he should not have done. He sutured the cut but inflammation set in; the eye became shrunken, useless, and a danger to the other eye, and was eventually removed.

An action for damages was brought on behalf of the child against the hospital and the surgeon.

It was contended that it was negligent to have made the hole and then to have failed to close it scrupulously and precisely, and it was said that the hole was closed with the needle to be used for the squint operation and not with the finer needle used for scleral holes. It appeared that when the surgeon pulled the muscle from the globe he pulled a puckering of the scleral coat so that he cut through a fold of the scleral material when he cut the muscle, and the two expert witnesses for the child were not agreed as to how the surgeon could have avoided that result.

Mr. Justice THOMPSON said that he was satisfied that it was impossible to establish that an efficient closure of the hole could not be made with the needle used. As to the cutting through the scleral material, he found that he could not resolve the lack of identity of views.

The conclusion was that the reality facing a surgeon performing a second operation for squint was that, to be quite

certain not to cut the sclera, he would have to cut so far away from the attached part that he would only create difficulties in carrying out the adjustment of the external muscle; and later when the tag of material left had to be trimmed off the globe, a similar danger of cutting the sclera would be present.

There was no special surgical technique which should be slavishly followed by a surgeon performing the particular operation, and the burden was on the plaintiff to show that the surgeon's skill and judgment was at fault and that he had fallen below the standards of competent surgery in the way he performed the type of operation which he chose to employ. In those circumstances a surgeon must bring his skill, experience, and judgment to bear on the operation. The surgeon had exercised all due care and skill and the child was unhappily the victim of mischance. His Lordship gave judgment for the defendants.

White *v.* Board of Governors of Westminster Hospital. *Queen's Bench Division:* Thompson *J.* Oct. 25, 1961. Counsel and solicitors: J. S. Watson, Q.C., and Michael Ogden (J. F. Beer & Co.); Roger Ormerod, Q.C., and Patrick Back (Hempsons); John Wood (Trollope & Winckworth).

G. L. PIMM
Barrister-at-Law.

Public Health

Iodine 131 in Milk

THE first results of investigations of iodine 131 in milk since weapons tests were resumed by the Soviet Union were made known on Oct. 24 at the same time as a general statement by the Medical Research Council.[1] Further figures from the Agricultural Research Council Radiobiological Laboratory were published last week.

Milk from 20 depots in Central and Southern England, Wales, Scotland, and Northern Ireland is collected daily and examined for levels of iodine 131. This is a considerable expansion of the sampling which has been carried out during the past six weeks at 8 sites in different regions. Information on regional differences of iodine 131 is obtained each week by analysing samples collected from more than 200 depots which handle over 40% of the total milk produced throughout the United Kingdom. The samples are combined in proportion to the quantity of milk handled by the depots from which they are obtained so that the average level throughout a zone can be ascertained.

The weekly mean levels of iodine 131 in milk produced at 8 sites in different parts of the country have been as follows:

Week commencing	*μμC iodine 131 per litre*
Sept. 16	85
Sept. 24	109
Oct. 1	138
Oct. 8	150
Oct. 15	114
Oct. 22	158
Mean for 6 weeks (Sept. 16–Oct. 28)	126

Mean results for samples collected in different areas on Oct. 2, 16, and 23 were:

Zone	*μμC iodine 131 per litre*
1. Northern England	111
2. North-West England	100
3. East and East Midland	82
4. West Midland	106
5. Wales	174
6. South and South-East England	99
7. Mid-Western England	96
8. Far-Western England	143
9. Scotland	178
10. Northern Ireland	161
Countrywide mean weighted for production	121

The Medical Research Council concluded that " an acceptable dose would not be exceeded in any age group of the population unless an average concentration of iodine 131 in milk of 130 micro-microcuries per litre was exceeded over a period of one year, or higher concentrations for correspondingly shorter times". The countrywide mean of 126 μμC per litre for the six weeks ending Oct. 28 represents about one eighth of the total quantity of iodine 131 which would give rise to the annual average of 130 μμC specified by the Medical Research Council.

1. See *Lancet*, Oct. 28, 1961, p. 970.

Early Discharge in Puerperium

In his report for 1960, Dr. K. A. Soutar, medical officer of health for Surrey, refers to the early discharge from hospital of women in the puerperium. Such discharge, he says, is undesirable since it constitutes a break in continuity of care and throws a heavy burden on the domiciliary midwifery service.

The report shows that in Surrey the main burden of the increased number of births in recent years has fallen on the domiciliary service. Thus, in 1960 domiciliary confinements were 59% more than in 1952, while hospital confinements were only 19% more. In these years the number of hospital beds for maternity cases in the county has not been substantially increased; and the hospital service has been able to meet the increased demand only by early discharge: whereas in 1956 early discharges numbered 605, in 1960 they numbered 1440. In the summer of 1960 the regional hospital board circularised hospital management committees in the county expressing the hope that maternity units would retain patients in hospital for the full duration of the puerperium, and pointing out that if this was to be achieved patients might have to be more strictly selected for hospital confinement. It does not appear, says the report, that the circular has had the desired effect. Many of the present difficulties will disappear when the regional board can complete its programme of expansion of maternity accommodation; " but there seems little likelihood of an early solution in this way ".

Increase in Drunkenness

The number of offences of drunkenness proved in England and Wales during 1960 was 68,109,[1] the highest number recorded since 1938. The number of offences per 10,000 of the population aged fifteen years and over was 19·31, which almost equals the peak of 19·34 reached in 1957. In 1958 there was a sharp fall in the number of offences, but since then the figure has risen and last year the increase was 2922 (4·48%) cases compared with 129 (0·20%) in 1959. There were 1547 offences among young people under eighteen, of which 268 occurred in Liverpool and 189 in the Metropolitan police district.

1. Offences of Drunkenness, 1960. H.M. Stationery Office. Cmnd. 1501. 1961. Pp. 15. 1*s.* 3*d.*

Infectious Diseases in England and Wales

Diseases	Week ended October			
	7.	14	21	28*
Diphtheria	1	1	2	1
Dysentery	329	327	292	329
Encephalitis:				
Infectious	7	2	4	1
Postinfectious	..	..	1	1
Food-poisoning	243	234	184	284
Measles, excluding rubella	1072	1256	1245	1163
Meningococcal infection	16	15	12	15
Ophthalmia neonatorum	6	25	12	22
Paratyphoid fever	2	10	7	5
Pneumonia, primary or influenzal	112	133	145	139
Poliomyelitis:				
Paralytic	36	49	78	62
Non-paralytic	7	14	16	13
Puerperal pyrexia	174	166	166	166
Scarlet fever	248	338	364	349
Smallpox	..	..	..	..
Tuberculosis:				
Respiratory	288	332	336	307
Meninges and C.N.S.	2	6	2	3
Other	37	73	40	43
Typhoid fever	3	4	2	2
Whooping-cough	223	221	231	158

* Not including late returns.

Conferences

PSYCHOSOMATIC DISORDER IN ADULT LIFE

A CONFERENCE on this subject was held in London on Nov. 3 and 4 by the Society for Psychosomatic Research.

Syndrome Shifts and Personality Traits

Dr. J. M. VAN DER VALK (Amsterdam), discussing clusters of illnesses and syndrome shifts observed in clinical practice, cited the patient who lost his eczema when his bronchial asthma came on: the new symptom was a result of the physician's therapy. Other examples were the dumping syndrome following partial gastrectomy, and hypertension or bleeding gastric ulcer following corticosteroid therapy. A syndrome shift could also occur through a husband developing his wife's asthma; and a group illness such as eneuresis in the eldest son, stuttering in the middle one, and asthma in the third had been noted in a family with a dominant mother. Syndrome suppression was evident in patients with rheumatoid arthritis who lost their symptoms when pyrexial from some other cause.

Dr. J. BASTIAANS (Amsterdam) questioned the importance of personality traits in specific syndromes and suggested that a psychosomatic state was the result of failure of the organism to establish normality. In the healthy the superego, the ego, and the id were in equilibrium, but that the id could influence the psyche soma was shown in the fantasy dreams experienced by a woman treated with male hormone for carcinoma of the breast. A patient with a weak superego/ego relationship was hysterical, and one with a strong superego/ego was hypertensive. Psychiatric testing suggested that patients with psychosomatic disorders were more extroverted than were psychoneurotics.

Dr. D. M. KISSEN (Glasgow) described pulmonary tuberculosis as a classical psychosomatic illness due to deprivation of affection in childhood, and said that patients with relapsing pulmonary tuberculosis had fewer psychosomatic disorders than non-relapsing patients.

Dr. M. B. CLYNE (London) thought that some psychosomatic illnesses were iatrogenic, and that the doctor-patient relationship was a mirror of syndrome shift; and he warned against the therapeutic zeal of the doctor leaving a patient sad at the loss of his syndrome. The man cured of his peptic ulcer might develop angina. A patient treated with steroids for his dermatitis became depressed and volunteered the statement: "I was better off with my dermatitis."

Dr. H. GAINSBOROUGH (London) wanted to know who would handle the psychosomatic case.

Emotional States and Physical Symptoms

Psychological Aspects

Dr. H. H. WOLFF (London) asked why emotional conflicts were expressed in psychosomatic symptoms. The over-aggressive man with no emotional or physical outlet developed functional dyspepsia and a gastric ulcer. A psychosomatic symptom might be the end-product of disturbed physiology, but it might also express emotional upsets and fantasies in somatic form. He thought that a patient got better results from the psychiatrist if he presented with a psychological rather than a somatic symptom.

Dr. J. HAMBLING (Canterbury) said that psychosomatic disorders were seldom associated with guilt, anxiety, or personal responsibility but that guilt feelings were easier to remove in the psychosomatic patient than in the psychoneurotic.

Dr. J. KELNAR (London) maintained that the ego always defended itself in the same somatic form.

Physiological Aspects

Dr. J. B. BRIERLEY (London) described the possible pathways, centring chiefly in the hippocampus and amygdaloid nuclei, the mammillary bodies, and the temporal lobe, which were thought to be responsible for the connection between psyche and soma.

Mr. P. SCHURR (London) demonstrated the connections and intimate blood-flows in different parts of the pituitary gland and the neurological connections with the hypophysis. It was conceivable that through these tracts the influence of hormones and corticosteroids was exerted on behaviour mechanisms.

Prof. W. J. H. BUTTERFIELD (London) stressed the importance of switching the interview from the patient's physical ailments to his underlying personal problems. He postulated that the autonomic system was necessary to goad the viscera into facing their problems. He went on to suggest that, just as Sheldon had proposed a typing of individuals according to their soma, so it should be possible to type according to the autonomic nervous system.

The Patient and His Environment

Dr. C. F. RYCROFT (London), discussing the effect of the psychoneurotic patient on his environment, said that a child can bind a parent just as one parent can bind the other; indeed, the child might be able to manipulate a sense of guilt. Where there was a psychoneurotic parent, the child might have no means of escape.

Dr. P. E. S. LOMAS (London) discussed the family interaction and the sick role. Adoption of this role might be the means of acquiring domination in a family, and attack could then be made on those in control of the family. Sometimes the sick role (as by sadomasochistic behaviour) might be used to induce illness in other members of the family.

Dr. M. E. M. HERFORD (Slough) talked about the effect of psychosomatic disorders in industry. Stress might be healthy in an individual; but the stress of the individual might not always be healthy in relation to the group, and it was a common observation that 75% of a general practitioner's time was taken up by 25% of his patients. If a group was discontented it could put pressure on one member, and indeed might produce a group symptom syndrome in that individual.

Prof. G. M. CARSTAIRS (Edinburgh) pointed out that there were certain stressful roles in industry and thought that supervisors probably had more psychosomatic illnesses. A person in a stressful position had a constant desire to retire.

DRUG ACTION AND MODERN THERAPY

THE Anglo-German Medical Society, which was founded in 1959, now has about 100 British and 200 German members. Its annual meeting, held in London during the last weekend in September, was devoted to a symposium in four sections—dealing with oral antidiabetic agents, the anabolic and gestational steroids, the newer drugs used in psychiatry, and side-effects of drugs. The proceedings will be summarised in the next issue of the society's journal, the *Anglo-German Medical Review*.

The British president of the society is Prof. J. S. MITCHELL (Cambridge) and the German president Prof. H. BENNHOLD (Tübingen). The secretary in this country is Dr. E. Kawerau, St. James' Hospital, Balham, London, S.W.12.

Oral Drugs in Diabetics

Dr. K. H. MAIWALD, in a paper written with Prof. J. D. ACHELIS, reviewed present knowledge of the action of oral antidiabetic agents. New and interesting speculations arise from the work of a team under Hasselblatt who has shown that tolbutamide can reactivate insulin which has been inactivated by binding to guineapig antibodies. Possibly sulphonyl ureas break up insoluble polymerised depot insulin.

Dr. GEORGE A. STEWART described research in this country particularly on the new oral antidiabetic drug cyclopropane carboxylic acid. The clinicians who use these drugs were represented by Dr. LESLIE DUNCAN, by Prof. K. OBERDISSE, and by Dr. D. MÜTING, whose work on the relation between diabetes and aminoacid and protein metabolism was referred to. It is not generally appreciated that diabetes mellitus may be accompanied by an aminoaciduria in which methionine predominates.

Anabolic and Gestational Steroids

Prof. K. JUNKMANN reviewed the chemistry and pharmacology of this group of substances, with particular reference to the norsteroids. He showed, among other things, that pharmacological properties were possessed in varying degrees by the different substances.

Dr. VICTOR WYNN described metabolic balance studies with anabolic steroids—particularly with methandienone ('Dianabol'). He demonstrated that, in addition to its peripheral action, this compound has a considerable central effect—presumably on the pituitary. In a case of Cushing's syndrome, for example, in which fludrocortisone had had little effect on the excretion of ketosteroids and hydroxycorticoids, dianabol much reduced their excretion. Again, in a patient with hyperthyroidism, dianabol significantly decreased radioactive-iodine uptake by the thyroid gland.

Dr. J. NAPP surveyed the usefulness of progestagens in gynæcology. The impression gained was that these are often curative in menometrorrhagia and are of value for the induction of ovulation in women failing to ovulate.

Dr. ARNOLD KLOPPER said that, among the oral progestagens, there were distinct differences between the nortestosterone derivatives and the progesterone derivatives. The former were more effective in controlling bleeding from the endometrium and produced endometrial pictures characterised by glandular regression, either with stromal hypoplasia also, or with relative stromal overgrowth. With the progesterone derivatives, the picture was more similar to that produced by progesterone. Dr. Klopper reported that enol luteovis (which is a cyclopentyl-enol ether of progesterone) appears to have a pure progesterone-like action on the endometrium; and unlike all the other oral progestagens, is metabolised to pregnanediol.

Dr. MARGARET JACKSON spoke of her experience with progestagens as oral contraceptives, referring mainly to enavid and norethisterone. They were effective in preventing conception, though in many women irregularity of the cycle resulted. This was particularly true of norethisterone alone (without added oestrogen); but, provided the women did not mind having periods at unpredictable (and usually infrequent) intervals, this did not seem to matter.

ANIMAL PROTEINS

THAT the world shortage of food is primarily a shortage of proteins is well recognised. The exploitation of the world's fauna for food was discussed in a symposium held by the Institute of Biology on Oct. 27 and 28.

Dr. F. AYLWARD said that the latest F.A.O. estimates of daily requirements, taking account of individual variation, waste, and quality, have been used by the U.S. Department of Agriculture to calculate an annual world deficiency of approximately 1·8 million metric tons of animal protein, 0·4 of pulse protein, and 35 of "other" protein.

Dr. A. E. BENDER showed that a judicious mixture of plant proteins can make a major contribution to the diet and relieve the pressure on animal protein supplies. As the nutritive value of a protein is the product of quality and quantity, any loss of quality through improper processing is equivalent to a reduction in protein supplies; considerable efforts are being devoted to avoiding such damage.

This point was well illustrated by Mr. P. L. PELLETT and Mr. D. S. MILLER in describing the preservation of local surpluses of meat in underdeveloped areas. The addition of as little as 5% of the calories in the form of meat can transform a poor African diet, barely adequate for adults, into one suitable for young children—if the meat is properly processed.

The potentialities of animal husbandry in West Africa were discussed by Mr. T. J. LANSBURY, who stated that a rapid increase in the numbers of cattle is neither desirable nor possible but that supplies could be increased through better management, attention to the conservation of soil, grass, and water, and control of the movement of cattle.

Sir JULIAN HUXLEY referred to the recent Arusha conference dealing with the possibilities of "farming" wild game, and Dr. L. HARRISON MATTHEWS discussed the subject in more detail. Wild animals, such as zebra, wildebeeste, and eland, need no attention and (possibly even more important) their forage is material not consumed by domestic cattle.

Prof. A. G. BANNIKOV (who was not present to read his paper) reported how modern control hunting of the very fertile Saiga antelope in the U.S.S.R. provides 6000 tons of meat per year.

Another unusual foodstuff is the giant African snail described by Mr. R. ORRACA-TETTEH. This reflects the fallacy of regarding, as so many people in the West do, meat, milk, and eggs as the only proteins worth considering, and ignoring such foods as caterpillars, insects, and snails. Each of these snails provides 300 g. of meat. The protein content of snail meat is similar to that of beef, as also is the quality provided there is no damage during drying.

An abundant reservoir of protein lies in the sea. Mr. E. B. PARRISH discussed potential yields by traditional methods, while Dr. F. D. OMMANNEY discussed the exploitation of the tropical seas. Over the past ten years steps to increase the catch have included improvement of craft and gear, and search for new fishing-grounds; and marketing has been improved. In the tropics this industry was, and to a large extent remains, extremely inefficient and old-fashioned.

The general improvements that are taking place in marine fishing methods and gear were described by Dr. J. SCHÄRFE. The most spectacular development in trawling is the introduction of large stern trawlers (instead of traditional side-trawling) from fast powerful vessels fitted with every known navigational aid as well as fish-processing machinery.

An entirely new development is electrical fishing, depending on the tendency of fish in an electrical field to swim towards the positive electrode. The working range of the equipment is only a few metres, but it is of great value in shallow lakes and rivers. The fish are stunned by the current; and as large fish receive a greater shock than do smaller, such fishing is selective.

About a fifth of the world's fish catch is obtained from fresh and brackish waters, and fish culture in these waters was described by Dr. K. F. VAAS. Inland waters may be providing a much greater proportion of the animal protein of the diet than has been estimated, as so much does not reach the market but is consumed by the fisherman on the site. Pond culture is practised in Northern Europe and the United States. In the Far East there is special interest in the cultivation of carp and tilapia in the flooded rice fields; in addition to the fish crop the yield of rice is increased.

Shellfish, discussed by Mr. P. R. WALNE, offer a further addition to our food-supply. For example, Japan lands forty times as much shellfish as does this country. Cultivated oysters can yield between 2·5 and 3·7 tons of meat per acre, while mussels can yield 5–10 tons.

Dr. D. L. NICOL pointed to the conservation of protein possible through better methods of processing fish; even when packed in ice it becomes stale after two weeks. As the average distant-water voyage is 20 days, with a 4-day journey each way, first-caught fish is 16 days old on landing and little of the catch is in good condition. Freezing to −29°C is the method of choice, whereby perfect condition can be maintained for 8 months, with a possible storage life of up to 4 years.

Sir ALISTER HARDY discussed farming, as opposed to hunting, of fish. Adding fertiliser to feed plankton and producing upcurrents to bring up the richer waters from below are applicable only to small confined areas, and not to the open sea. Attempts to increase the numbers of fish by keeping the fry in hatcheries until they are old enough to fend for themselves are more promising than the earlier methods. Small-scale experiments have suggested that it would be profitable to transplant young fish from grossly overcrowded waters to less crowded areas where they would have enough food to grow more rapidly. It has lately been found that invertebrate competitors consume four times as much food as does the same weight of fish, and that only 1–2% of the potential fish food is actually eaten by the fish. Some type of pest eradication might greatly increase the yield of fish.

In England Now

A Running Commentary by Peripatetic Correspondents

IN our hospital, which is blessed, as every hospital should be, with a spacious garden where battered patients can exchange liver-stories and air their wounds in peace under the shade of green trees, one is constantly running into figures clad in a manner which to the insular British mind always means an onion-seller with a bicycle and broken English. However, it would be wrong to fall into the trap of interpreting all such figures in this way; underneath those blue overalls and berets there beat a variety of hearts, tuned each to a different measure. One law, nevertheless, is obeyed—and this is already something, in France today—namely, that the paler the blue, the bigger the man. If it were not for the fact that a *chef de cuisine* is on an entirely different plane, his blue would be the palest of all; indeed it may be that the traditional white robe of this archpriest is intended to denote the ultimate extrapolation of pallor. With this rule in mind, at all events, one is able to solve with some confidence the problem of *politesse* and to gauge with nicety the appropriate degree of *chaleur* for one's daily greeting. (In fact this phenomenon is not daily, but even more frequent; not once, but several times a day, one is apt to see the same couple exchanging compliments, handshakes and general *causerie*, half in and half out of the same doorway as they pass through it in opposite directions.)

Thus it was, *en revenant à nos légumes*, that one day I was able to identify the pale blue backside of the head gardener as being really his, when I saw it protruding from the bushes near to the cobalt radiotherapy unit, established now some years ago. It was unthinkable that so august a figure should be lurking, although with the *plasticueurs* and para-sexual nuisances of recent times lurkers are not unknown around our neighbourhood, and so I watched in some puzzlement to see what was going on. After some minutes of more or less agitated posturing on his part and *sangfroid* on mine, I saw that he was in fact scrutinising the leaves of a seemingly inoffensive bush. Grappling with an unusual vocabulary snag, I found eventually that this undignified phenomenon was in reality an earnest search for abnormal mutations. Among ourselves, we have come to call the unit the " cobalt bomb " and evidently the word must have spread. Heaven knows what thoughts of Anglo-Saxon perfidy must have been running through the mind of this excellent and conscientious man as he scouted around for the deadly evidence of fall-out. He has always been very friendly, and he seemed a bit sheepish as he explained what he was doing; but all the same a mysterious flight of concrete stairs, disappearing into the darkness below the lawn, has recently made its appearance. If the worst comes to the worst, at least the head gardener and the chef can be saved, I suppose.

* * *

It is not such a far cry as you would think from an English baby clinic to an ancient Chinese postprandial custom. Mrs. S. brought her first-born with the complaint that she could not bring up its wind. The baby took its feeds easily and speedily. It was quite healthy and happy (apart from a sore back?) but mother-in-law insisted that the wind must be brought up lest it harm the baby's delicate inside. I explained that swallowing large mouthfuls of readily extracted milk will not allow excessive intake of air during feeding. When the milk is obtained with difficulty the baby swallows many more times. Only a few drops of milk and a bolus of air go into the stomach with each swallow, so that at the end of the feed the stomach is blown up like a balloon.

As she gathered her baby up and departed, I had a sudden vision of polite Chinese mandarins belching at each other to show appreciation of hospitality. Then it dawned on me that a large meal eaten with chopsticks supplies a little rice and a bubble of air with each of many swallows. How subtle is the courteous social custom which decrees that one should belch after such a meal.

* * *

" The cat sat on the mat," outside the casualty department, with all the dignity that cats have had since the days of Ptolemy. Then she bent down and nibbled and chattered with her teeth half an inch above the ground in front of her paws and round her right side in the way that cats do when troubled by fleas in the tail. An ambulance came into the courtyard and she moved. Sister noticed that two-thirds of the tail were missing and remembered that the cat had been the victim of an impetuous car driver outside the hospital gate two months previously. Sister is an astute observer and she is now convinced that humans are not the only creatures who suffer from " phantom limbs ".

* * *

" Automatic anæsthesia," proclaimed the lecturer proudly, " is not a dream of the future. It is reality." A slight pause for effect, while the implications of this climbed slowly up to the cerebral cortices massed before him; and he went on to outline a system whereby the amount of anæsthetic delivered to a patient is regulated by the electrical activity of the patient's own brain. Honesty compelled him to add that his brave new world has snags at present: for one thing the machine-anæsthetist, it seems, is far more easily upset by static electricity emanating from restless assistants than its traditional human counterpart. There are, he admitted, one or two other technical difficulties still to be overcome; but it was clear that he was eagerly awaiting the day when his anæsthetic colleague would be immobile, dumb, perhaps less complex, and infinitely shinier.

I felt that the machine has a lot to learn. " This patient's damned tight," from the depths of a dark and difficult hole is unlikely to melt a stony computeric heart. And who will teach it the efficacy of a soothing dose of blame-it-all-on-me? Will it learn to murmur approbation when that one-in-a-million diagnosis turns out to be right after all? Or deliver the proper mixture of sympathy and restraint when some particularly unhelpful exposure leads to " this " being " the most difficult one I've ever done?"

Then a good deal of extra responsibility will devolve on the nursing staff. They will, for instance, have to master the Test-Match scores and become conversant with all the current shows in town. Someone will have to be appointed to gauge the emotional temperature. Perhaps electrographic monitoring could be arranged for the surgeon's brain too?

* * *

I wonder if we realise how some patients regard our lightest word.

The old lady had been ill for many years and I always went to see her on Saturday. Last week she was, if anything, a little better than usual, and I was surprised to be told on Tuesday that she had died. I hastened round to offer my sympathy and said that I had hoped she would live for quite a while yet. " But, doctor, you told us on Saturday she was going to die."

" I did? How? "

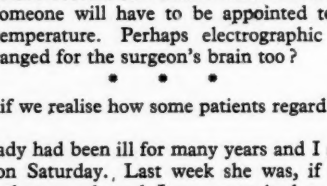
" You always used to say ' Cheerio.' On Saturday you said ' Goodbye '."

* * *

ANGLING NOTE

The common chub, or chavender,
Is of no use for provender,
So, though the creature is no doubt
Looked down upon by salmon trout,
If ever (though I've no such wish)
I should one day become a fish,
I'd be a chavender, or chub,
And not the slightest use as grub.

* * *



Letters to the Editor

DOCTORS FOR THE FORCES

SIR,—Two main things must be done now to stimulate recruitment of medical officers for the R.A.M.C.:

(1) All National Service medical officers should be offered a 3-year or 5-year short-service commission, with attractive gratuities, to date from the beginning of their National Service, and all such service should be paid in retrospect as regular service.

(2) A clear statement should be made of the role of the R.A.M.C. and a clear exposition given of its career structure for those of consultant and non-consultant status and for non-medical officers.

All consultant appointments in military hospitals should be advertised in the medical journals, as are comparable civil appointments, and the rewards and conditions of service should be such that the R.A.M.C. would be able to select the best. Such consultants on first appointment would have the substantive rank of colonel. Many hold that the complete training for consultant status in those suitably qualified should take place in civil life for physicians (including psychiatrists), surgeons of all kinds, obstetricians, pathologists, and dermatologists. There would then be a consultant group in the R.A.M.C. with the higher qualifications and training of those in civil life.

The R.A.M.C. has much to offer in postgraduate training; but it can never be regarded as a postgraduate medical centre, nor can the R.A.M. College be regarded as a medical school, nor are its hospital and laboratory facilities adequate for the complete training of young consultants. Some hold the view that here the R.A.M.C. is doing a job which should be done by civilian hospitals, particularly teaching hospitals. But I believe the R.A.M. College has a big part to play in postgraduate instruction, especially in Army health and preventive medicine, tropical medicine, surgery in the tropics, the surgery of trauma, resuscitation, and the physiology of life in extreme climates. What has been achieved so far, and the drive behind it, deserve the highest praise, but it was based on an ideal conceived before World War II and one that belongs to the pre-National-Health-Service era when individuals decided to become consultants and, outside the large teaching centres, were largely responsible for their own training. Today the minimum requirements for consultant status are certain diplomas, a particular standard of training, and contributions of quality to the medical literature. The prospective Army consultant must be enabled to meet these requirements as speedily and effectively as possible.

From non-consultant medical officers there would be selected officers for training as Army-health officers, who would be eligible to fill all the appointments normally filled by Army-health officers at present. All other medical officers would work in and out of hospital where the best use could be made of their special skills until such time as they may elect to move to the predominantly administrative side of the Corps. While employed essentially as military doctors they could train in a specialty in which they were particularly interested. They might then be designated Army medical practitioners with special experience in (for example) obstetrics and gynæcology (D. OBST.), child health (D.C.H.), anæsthetics (D.A.), or tropical medicine (D.T.M.& H.).

Thus the non-consultant officer would have a full professional career with "specialist" experience using the word in a different sense to that of embryo or established consultant. They would draw qualification pay for their postgraduate diplomas and experience. As a special incentive, medical officers who look after families as well as troops should be paid a capitation fee for every Service dependant in their care, and the fee should be comparable to that of a civilian G.P. I suggest this because in the view of many G.P.s one soldier on his list is as time-consuming as four civilians, because of all the routine vaccinations, routine medical examinations, and paperwork.

The time has come for the provision of regimental (non-medical) R.A.M.C. officers commissioned at an early date via Sandhurst. They would subsequently train on a special syllabus to fit them for R.A.M.C. duties, and a special career structure would be devised for them, including promotion to lieutenant-colonel, full colonel and brigadier. We must also accept the principle that military doctors should only be in a field medical unit when such a unit is on active service. There is no doubt that there are many appointments in the Army Medical Service which could be filled to the satisfaction of the service by regimental (non-medical) officers R.A.M.C. The quartermaster commission would remain as at present.

My proposals therefore are:

(1) Service pay and conditions of service should be well above those in the N.H.S.

(2) All senior specialists in the R.A.M.C. would be called consultants and these appointments would be advertised in the medical journals and offered only to individuals considered fully qualified in all respects for hospital consultant appointments in civil life in teaching hospitals and recognised hospitals under the N.H.S. All such consultants would be commissioned in the substantive rank of colonel.

(3) All other medical officers commissioned in the R.A.M.C. would be eligible to be employed as military doctors in a predominantly professional capacity up to and including the rank of colonel should they so desire. They would all be entitled to train in G.P. specialties, for which they would receive qualification pay. Medical officers looking after families would receive a capitation fee for each dependant. At any time up to, say, 10–12 years or earlier they may elect to transfer to the predominantly administrative side of the Corps and attend Staff College.

Tidworth, Hants. J. MACKAY-DICK.

SIR,—I should like to endorse some of Dr. Leeson's constructive suggestions (Oct. 21) arising from your excellent leading article. I have greatly enjoyed over a year of surgical practice in a military hospital during which time I have had an active part in the management of a wide range of clinical conditions, including traumatic surgery, general surgery, orthopædics, and genitourinary surgery, occurring in sufficiently small numbers to give time for attention to detail. With the addition of the more routine ward work and operating, fairly extensive documentation, reporting and discussing clinical problems, and reading there seems to be even less spare time than there was in previous civilian practice. Visiting and assessing patients in civilian hospitals often many miles away has added further valuable experience. The usefulness of this kind of experience, the teaching available to trainees, and the provision of such facilities as research and lectures which Dr. Leeson mentions depend both upon the attitude of the senior officers to clinical work and the individual effort of interested juniors. These opportunities should be publicised, for they can make a contribution to a medical career which may outweigh the disadvantage of being away from the civilian "rat race" for a while. The regrettable experience of National Service medical officers has produced a discontent which can only be answered by

promoting the professional interests of doctors within the Forces, and not by offering purely financial inducements.

British Military Hospital, Hanover. GORDON BROCKLEHURST.

SIR,—Dr. Whitty (Oct. 28) suggests that the solution to the shortage of Service medical officers is to form the much discussed Combined Services Medical Service.

This in my opinion is not the solution. A doctor joins a particular service because he is interested in the soldier, sailor, or airman, and the medicine associated with the field, tank, ship, or aeroplane. The thought of joining a service which would direct a doctor into any one of these roles, rather than the one he intended to belong to, would be as attractive to the general service doctor as it would be to Dr. Whitty if a responsible body directed him from neurology to public health.

There is naturally liaison between the three Medical Services dealing with the personnel concerned with national defence, and the fact that specialised units between the services worked well together during the last war is borne out by the fact that this still continues. I hope, however, that Dr. Whitty does not suggest that the expert in field-hospital management can be equally efficient in dealing with the day-to-day problems of a V-bomber crew.

The solution lies far more in making the pay and prospects of the Service doctor equal to those of his colleague in the health service in every grade.

Royal Air Force College, Cranwell. M. G. P. VENN.

OPERATIONS UNDER ANÆSTHESIA IN OLD PEOPLE

SIR,—I am in general agreement with the views of Dr. Simpson and his colleagues (Oct. 21) on operation and anæsthesia in old people.

My series of 18 cases of abject dementia that arose out of 251 old people undergoing operation under anæsthesia relates to the period 1949–54 (as Dr. Simpson and his colleagues point out). Their series concerning 741 patients in whom no dementia was discovered after operation under anæsthesia relates to a decade later than mine, though both our series came from approximately the same region. It is, however, worthy of note that Dr. Simpson and his colleagues refer to a man they saw, but did not include in their series, who had had too much morphine and later underwent considerable mental change. They also point out that matters have changed a good deal in the interim between my series and theirs.

The fundamental cause of any differences that might exist between us stems from the definition of "operating under general anæsthesia". I take this to mean a series of continuing sequential episodes starting with the admission of the elderly patient to hospital; his routine premedication with morphine and hyoscine; the operation itself with its invariable trauma and blood-loss; and the maintenance (often for a long time) of a posture which often inclines the whole body downwards from the feet to the head. My definition also includes the effects of the anæsthetics themselves, including muscle-relaxant drugs, whatever their relevance (and I believe that the only really relevant factor is the temporary interruption of the baroceptor reflex mechanisms which causes blood-pressure to fall if the patient is put in an upright or head-up position). The series of events also includes the postoperative medication (often given without thought of whether the patient needs more morphine or hyoscine and suchlike); and the failure to realise how very necessary it is to correct without delay such biochemical imbalance as has developed during this sequence of events.

Even more important is the allocation of responsibility for postoperative care. After the operation, the patient tends to come all too often between the Scylla of the surgeon and the Charybdis of the anæsthetist; and in fact may have no immediate postoperative attention other than that provided by the porters who wheel him back to the ward and the nurses who may put him into Fowler's position, the dangers of which my friend, Dr. Bourne, has again pointed out in his letter of Oct. 28.

At any point in this chain of circumstances, the patient may suffer irreversible damage unless all his attendants are fully aware of the possible hazards he is facing.

I have good reason to believe with Dr. Simpson and his colleagues that this awareness is becoming increasingly apparent throughout the country and in particular in the region from which our series were drawn.

While taking Dr. Lewis's point (Oct. 28), which in essence alleges that dementia was confused with depression, I can only assure him that this was not the case in my own series and I doubt very much whether it was in Dr. Simpson's.

Now that a greater awareness exists among surgeons, anæsthetists, and nursing staff of the dangers of operations on old people, I firmly believe that too few operations are done rather than too many. It is only too obvious that surgeons are often reluctant to operate, except in dire emergency, on an aged person, on the grounds of age alone. This attitude is untenable, but I must take some of the blame because of my series of a decade ago.

Old age alone is not, or should not be, a bar to surgery. A patient's fitness for operation should be assessed on factors that are common to all patients of all ages.

Cowley Road Hospital, Oxford. P. D. BEDFORD.

CAUSE AND EFFECT IN PERIPHERAL NEUROPATHY

SIR,—Dr. Lishman and Dr. Ritchie Russell (Oct. 28) have done much to clarify the broth of brachial neuropathy which, as they say, had become a thick soup through the efforts of too many cooks; so I hope I shall not fall into it by suggesting that it would be feasible to carry their argument based on free intraneural circulation one step further.

I should like to suggest that a lesion of the neural pathway may cause not only localised areas of pain in the distal distribution of that pathway, but may cause actual inflammatory reaction at these sites: for instance, it would seem not impossible that a brachial neuropathy might itself be responsible for the inflammatory thickening of the carpal ligament which, once initiated, maintains a reciprocal aggravation of the original condition, as Dr. Lishman and Dr. Ritchie Russell point out. It certainly falls within my experience that an obviously diseased carpal tunnel has been opened without relief of the symptoms for which it had been thought to be the sole cause.

It is difficult to adduce definite evidence for this hypothesis, which must depend more on clinical observation than on biopsy specimens or X-ray reports, but I should like to quote what may at first glance seem to be an irrelevant case.

A woman of 44 had pain in the right shoulder and down the arm into the hand which, despite physiotherapy, hydrocortisone injections, and rest, proceeded to an almost complete frozen shoulder that in the end had to be manipulated under anæsthesia. This brought about a big improvement in her symptoms but left considerable local pain and a 20° limitation of abduction at the joint. She was suffering at the same time from severe windy dyspepsia, pain in the right hypochondrium, and recurrent migraine, for which she eventually had a cholecystectomy. 24 hours after this operation, while she naturally still had some pain and wind, she found that her shoulder was not only entirely free from pain for the first time in a year, but that she had a complete free range of movement. The other symptoms cleared up after a normal postoperative course, and

no treatment (whether by accident or design) was given to the shoulder while she was under the anæsthetic.

If it is permissible to draw conclusions from a single case, it seems that diseases of the gallbladder can cause not only referred pain in the shoulder but changes in the joint capsule as well; so that on rare occasions one may have to look further than the cervical spine for the cause of brachial neuropathy, which emphasises how important it is to treat the patient as a whole and not as an isolated section of anatomy.

The same mechanism—whatever it may be—would explain a variety of well-known phenomena such as "arthralgia" in the left shoulder and the local areas of tenderness in the chest wall which may follow myocardial infarction, as distinct from (though presumably not unconnected with) the typical anginal pain so often felt in these distributions.

Backache and sciatica, typical of lumbar intervertebral disc lesions, often seem to accompany or follow close upon quite mild degrees of cystitis that have given no indication of being complicated by pyelitis or renal pain.

It would be easy to quote many more examples of this type of reaction, but your readers must have a much greater fund of clinical experience that will either confirm or refute my hypotheses.

Kingston-upon-Thames. CHARLES STEER.

THE INDUSTRY IT DESERVES ?

SIR,—Further to Dr. Laurence's letter of Nov. 4, may I respectfully point out that to deprive a drug of a trade name may cause a doctor considerable inconvenience on some occasions. When a new compound is deemed ready for clinical use, there often elapses a long period of time before the drug is officially given a generic name. During that interim period it surely is easier for a doctor to remember a drug by a trade name than as 1 : 4-pregnadiene-17α-21-diol-3,11,20-trione.

Camden Chemical Company Ltd., London, W.C.1. G. A. SCHMEIDLER.

ATYPICAL CASES OF SALMONELLOSIS IN HOSPITAL

SIR,—In view of Dr. Griffiths' interesting findings (Oct. 28), I should like to add the occurrence of arthritis as a manifestation of salmonellosis.

A medical student had been vaguely unwell for six weeks and was investigated in his teaching hospital and sent home to convalesce. During this time he had one short episode of diarrhœa. He was admitted to hospital on account of a painful swelling of one knee. He was febrile with a large effusion in the knee suggestive of acute rheumatism. There was a heavy growth of *Salmonella typhimurium* cultured from his stools and a subsequent rise in agglutination titres against this organism. With some difficulty, antibiotic control was secured with oral streptomycin and sulphadimidine. During the intervening period arthritis developed in the opposite knee, both ankles, and the small joints of the hands. There was considerable resolution in the arthritis when bacteriological control was achieved and complete resolution followed a 4-day course of corticotrophin (A.C.T.H.).

A man of 37 was admitted to hospital with acute polyarthritis. Three weeks earlier he had had a short episode of enteritis at the same time as other members of his family. At the time of admission *Salm. typhimurium* agglutination was positive at 1/2560 but no relevant organisms were obtained from the stools. But from the stools of one of his sons, who was symptomless, a heavy growth of *Salm. typhimurium* was cultured. The arthritis resolved completely after treatment with antibiotics.

In less acute cases with proven or strong presumptive evidence of similar infection the clinical picture is more like rheumatoid arthritis. The lower limbs tend to be predominantly affected.

Investigations directed to salmonellosis seem to be a justifiable addition to the battery of investigations of selected cases of polyarthritis.

St. Helier Hospital, Carshalton, Surrey. CEDRIC HIRSON.

NIGHT-CALL SERVICES

SIR,—The time has surely come for the N.H.S. to "take over" the private night-call services. The great number of postgraduate students in London makes it possible for these firms to pay very low wages to doctors trying to keep on good terms with their bank managers.

POSTGRADUATE.

DOWN'S SYNDROME (MONGOLISM)

SIR,—Recent correspondence on the naming of the syndrome generally known as mongolism appears to hinge on the belief that the newly coined "Down's syndrome" is the only possible alternative. It is true that there are circumstances where a euphemism is desirable for so well-known a condition, and it does not much matter what is chosen provided the users know what they mean by it, but euphemisms have no place in the titles of scientific articles. New words, even eponyms, are often enough necessary, but they should not be introduced as lightly as this one has been. There is a perfectly good alternative in trisomy-21, a highly specific ætiological label. It is true the trisomy is sometimes complicated by translocation (and might well in the future prove to have other complications), but surely the effective presence of the major part of three 21 chromosomes as a cause of the disease is as well proved as the relation of *Mycobacterium lepræ* to leprosy. Whatever the fate of this unnecessary eponym of Down's syndrome may be, I hope it will be kept out of scientific communications.

Incidentally, your original correspondents [1] raised the point of possible embarrassment caused to those of races we usually call Mongolian. I have discussed the matter with one Chinese pædiatrician, who tells me the term is in fact used without embarrassment in her country, for the term Mongolian is used there only for the inhabitants of the two relatively small areas we call Inner and Outer Mongolia.

Use of chromosome labels for syndromes is becoming rather difficult in some directions: but even here the dominant positions of XO, XXY, and XXX types of anomaly as the type defects of three main syndromes suggests that each of these sets of symbols can continue to be used as a conventional label for its syndrome. With trisomy-21, where the complications are not important in the region of nomenclature, the argument applies more cogently than anywhere else.

Department of Pathology, Western Infirmary, Glasgow. BERNARD LENNOX.

SIR,—The letter and the article in your issue of Oct. 28 admirably illustrates the situation. A parent welcomes the substitution of "Down's syndrome" for "mongolism" and this is natural. It is, however, established practice to use euphemisms for unpleasant diseases—malignant disease and epilepsy are examples—when speaking to patients and relatives. When writing for a medical public,

1. Allen, G., et al. *Lancet*, 1961, i, 775.

however, the technical word known to the medical public should be used. Mr. Hamerton and his colleagues (Oct. 28) rightly think that " mongolism " must be included in the title of their paper to make it intelligible to the medical public. Why, then, must they add two extra words which add nothing to the sense?

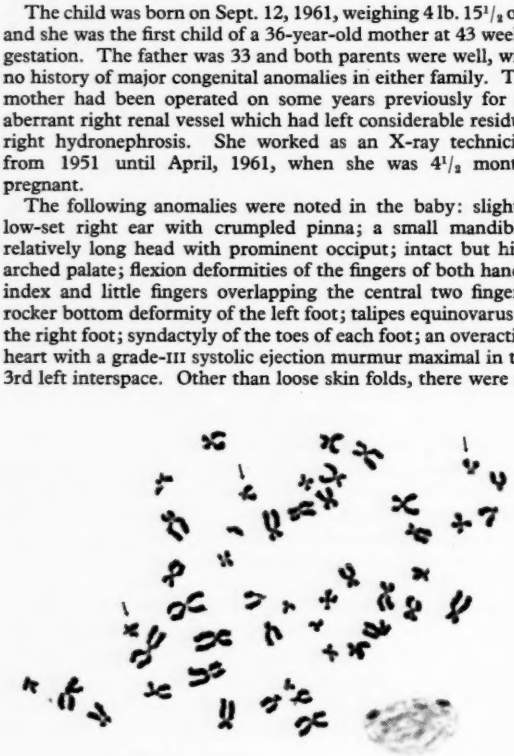
The Radcliffe Infirmary, Oxford. J. M. K. SPALDING.

XXX 18-TRISOMY

SIR,—Dr. Ford and his colleagues [1] reported an interesting case of double trisomy, a patient with both mongolism and the Klinefelter syndrome. We have found a similar case of double trisomy but involving different chromosomes.

The child was born on Sept. 12, 1961, weighing 4 lb. 15½ oz., and she was the first child of a 36-year-old mother at 43 weeks' gestation. The father was 33 and both parents were well, with no history of major congenital anomalies in either family. The mother had been operated on some years previously for an aberrant right renal vessel which had left considerable residual right hydronephrosis. She worked as an X-ray technician from 1951 until April, 1961, when she was 4½ months pregnant.

The following anomalies were noted in the baby: slightly low-set right ear with crumpled pinna; a small mandible; relatively long head with prominent occiput; intact but high arched palate; flexion deformities of the fingers of both hands, index and little fingers overlapping the central two fingers; rocker bottom deformity of the left foot; talipes equinovarus of the right foot; syndactyly of the toes of each foot; an overactive heart with a grade-III systolic ejection murmur maximal in the 3rd left interspace. Other than loose skin folds, there were no



Karyotype with 48 chromosomes. In the lower right corner is a cell with two sex-chromatin bodies.

apparent congenital anomalies and no hernias except for a hernia of the foramen of Morgagni noted on chest X-ray. Her genitalia were those of a normal female. Cardiac catheterisation and angiocardiogram showed a large interventricular septal defect, marked pulmonary hypertension, and very little shunt across the septal defect. An intravenous pyelogram demonstrated good dye excretion with a normal kidney on the left and moderate hydronephrosis on the right. The baby cries and sucks poorly and has been fed by tube. She has no Moro reflex. Her heart is gradually increasing in size and heart-failure seems imminent.

Because the infant had many of the congenital anomalies associated with the 18-trisomy syndrome,[2] the dermal configurations were analysed. All 10 digits have arches, the pattern typical of the 18-trisomy syndrome.[3] Chromosomal studies were then carried out.

Peripheral white blood-cells were cultured and gave a consistent count of 48 chromosomes. One extra chromosome belongs with pair 18, while the other belongs in the " C " group [4] (resembling 6–12 in the Denver classification). Buccal smears revealed two Barr chromatin bodies. The infant must therefore be an XXX 18-trisomy syndrome. Two other cases of double trisomy have been reported, both cases being mongoloid imbeciles with the Klinefelter syndrome.[1 5]

This infant is the fifth case of autosomal trisomy, not involving mongolism, that has been found in this centre: one 46/47 mosaic involving trisomy of one of the D chromosomes [6] (13–15) and four with trisomy of chromosome 18. The latter four are all similar in appearance.

Department of Pædiatrics and Department of Clinical Investigation and Research, The Children's Hospital, Winnipeg, Manitoba. IRENE A. UCHIDA J. M. BOWMAN.

BELLOC AND THE TAXATION JUDGMENT

SIR,—Following this rather unwelcome decision by the House of Lords in connection with taxation schedules, may I draw your attention to the final lines of Belloc's Cautionary Verse in *More Peers*—Lord Roehampton.

> With a dreadful oath, the Specialist,
> denouncing both
> The Budget and the House of Lords
> Buzzed angrily Bayswaterwards.
> And ever since as I am told
> Gets it beforehand; and in gold.

Clevedon, Somerset. NIGEL COBB.

LANGUAGE: THE LOST TOOL OF LEARNING

SIR,—Professor Pickering's important article demands comment. The anticipated reaction of the reader (" Surely this is nonsense . . .") in the third paragraph is definitely incomplete: *this* reader would like to call attention to the new science of general semantics, which, initiated in 1933 by Alfred Korzybski, concerns itself with language and its main purpose, communication. May I call attention to the voluminous literature on the subject, of which the most persuasive is S. I. Hayakawa's book *Language in Thought and Action*.

In assailing technical jargon Professor Pickering is in good company: about 200 years ago Goethe wrote: " Wo die Begriffe fehlen, steht ein Wort sich ein " (" Where conceptions are lacking, a word will come in handy "). However, words are symbols, and confusion of symbols with things symbolised must be guarded against. Context determines meaning; hence the word " shock " may indeed mean a different illness when used by different authors or at different times. Then, there is *extensional meaning*: " He suffered irreversible burn shock due to paralysis of vasomotors and loss of plasma into the tissues ", and *intensional meaning;* " It came as a shock to him ".

No word ever has exactly the same meaning twice, for no two contexts are ever exactly the same.

Why then use scientific terms? They are abbreviations, allusions, whose understanding requires knowledge. If people study no Greek and Latin, they are surely barbarians, a fact to be deplored. But why blame the educated for the other 9/10 of the population? Nephrectomy is surely an elegant way to say " removal of a kidney ".

Neither Professor Pickering nor anyone else is *sure* what " stress " or " atherosclerosis " mean. Words mean different things to different people at different times;

1. Ford, C. E., Jones, K. W., Miller, O. J., Mittwoch, U., Penrose, L. S., Ridler, M., Shapiro, A. *Lancet*, 1959, i, 709.
2. Smith, D. W., Patau, K., Therman, E., Inhorn, S. L. *J. Pediat.* 1960, **57**, 338.
3. Uchida, I. A., Patau, K., Smith, D. W. Abstracts of Annual Meeting of Society of Pediatric Research, 1961, p. 131.
4. Patau, K. *Amer. J. hum. Genet.* 1960, **12**, 250.
5. Lanman, J. Y., Sklarin, B. S., Cooper, H. L., Hirschhorn, K. *New Engl. J. Med.* 1960, **263**, 887.
6. Patau, K., Smith, D. W., Therman, E., Inhorn, S. L., Wagner, H. P *Lancet*, 1960, i, 790.

definitions tell us nothing about things, they only describe linguistic habits. And habits have a way of changing, as any student of the English language will confirm.

Baltimore, Maryland, U.S.A. GEORGE VASH.

THE CATARRHAL CHILD

SIR,—In your excellent review (Oct. 21, p. 925) of Dr. Fry's admirable book you quoted the appalling figure of an estimated 350 deaths resulting from the operation for removal of tonsils and adenoids in Great Britain over a period of ten years. How much longer is this going to go on? Is the medical profession convinced that it is worth spending about £3 million per annum on this operation in children with recurrent sore throats, colds, &c., if approximately 35 children have to lose their lives in the process? I think that the trouble is that the mortality-rate is so low that general practitioners and parents do not regard it as a risk to worry about at all. All the same, it means that each year unexpected tragedy strikes at 35 separate families in this country, and in human terms this cannot be brushed aside.

I feel that Dr. Fry's findings should be given the widest possible publicity. I find that most parents of "catarrhal" children are quite happy to be told that the operation is not a cure-all and may very likely be unhelpful in their child. It is interesting how the parents of the numerous children who have not benefited from the operation of "Ts and As" seem to accept the situation quite calmly and rarely question the value of the procedure.

Dr. Fry's masterly handling of the parents of his catarrhal children shows what can be done to avoid the operation altogether in a great number of cases, but of course this management needs time and patience, and ability to resist the inevitable question "shouldn't he have his tonsils out, doctor?"

King's Lynn, Norfolk. R. C. ROXBURGH.

URINARY EXCRETION OF UROCANIC ACID IN MEGALOBLASTIC ANÆMIA

SIR,—Interference with the function of the folic-acid coenzymes results in an inability to metabolise single carbon units such as the formimino-group of formiminoglutamic acid, and this material may be excreted in the urine. The major pathway of histidine breakdown is to urocanic acid and then via an unstable intermediary to formiminoglutamic acid. The enzyme urocanase in liver is responsible for the last stage.

In studying the urinary excretion of histidine derivatives after a dose of 15 g. of histidine by mouth we found that a high proportion of material in urine which donated a single carbon unit to tetrahydrofolic acid was both heat-stable and alkali-stable. This suggested that the material was not formiminoglutamic acid, which is rapidly destroyed by autoclaving at alkaline pH, and that the substance concerned was urocanic acid. This was confirmed by chromatography of urine, using pure urocanic acid for comparison.

After a dose of 15 g. of histidine by mouth, urocanic acid and formiminoglutamic acid were present in the urine of normal subjects, and of patients with addisonian pernicious anæmia, postgastrectomy megaloblastic anæmia, idiopathic steatorrhœa, as well as iron-deficient anæmia, hæmolytic anæmia, carcinomatosis, and acute leukæmia. The proportion of urocanic acid to formiminoglutamic acid in urine varied from zero to 97%.

Urocanic acid in urine can be estimated, together with formiminoglutamic acid, microbiologically[1] or spectrophotometrically.[2] Urocanic acid can be estimated alone by destroying formiminoglutamic acid by heat at alkaline pH; formiminoglutamic acid can be measured alone by removing urocanic acid with charcoal.

The liver of folic-acid-deficient rats has been found to be deficient in urocanase.[3] Either high levels of formiminoglutamic acid suppress the formation of urocanase, or folic acid is required for its synthesis.

Although there appear to be no previous reports of the presence of large amounts of urocanic acid in urine, small amounts have been found in sweat,[4] in normal urine,[5] and in the urine from infants with kwashiorkor.[6]

M.R.C. Experimental Hæmatology Research Unit, St. Mary's Hospital Medical School, London, W.2. MYRA C. BENNETT I. CHANARIN.

DISCS, LESIONS, AND SYNDROMES

SIR,—It seems that the time is now ripe for a reassessment of the present attitude towards syndromes that may originate in spinal joints. May I therefore suggest the following hypothesis?

The syndromes to which I refer include those with sensory, neurological, vascular, and visceral components evident in the distribution of single or neighbouring spinal nerves. These syndromes include those commonly attributed to "slipped discs", e.g., lumbago, sciatica, brachial neuralgia—and others not commonly considered to be of spinal origin such as the "post-cholecystectomy syndrome", the neurocephalalgias, vertigo, and certain syndromes with vascular and visceral components.

When a doctor sees a patient with one or more of these conditions he often regards the situation either from the peripheral angle (i.e., as lumbago, sciatica, muscular rheumatism, or fibrositis) and treats it symptomatically, or as a manifestation of a "slipped disc" and treats it by immobilisation or surgery.

The first attitude ignores the need to identify a *primary cause* for the changes in the affected units of the vertebral and nervous systems and in their environment. The second attitude ignores the possibility that spinal structures other than the degenerate disc may be subjected to mechanical and/or pathological changes which may in turn have an effect on the intraspinal and paraspinal elements of the nervous system. The latter includes the anterior and posterior roots, the common root, the anterior and posterior rami, the sympathetic chain, and the rami communicantes. Furthermore the supporters of this attitude seem to have failed to inquire into the *cause* of disc degeneration.

The primary functions of the vertebral column are locomotor, supportive, and protective. Only the first of these concerns us here, and this demands a consideration of the dynamics of spinal movement.

The currently accepted view of the vertebral column is that it is composed of a number of *vertebral* units each of which articulates with its neighbours by means of the intervertebral disc. The existence of the paravertebral, zygapophyseal, neurocentral, costovertebral, and costotransverse joints, without which the vertebral column would be about as stable as a column of children's building blocks, is almost completely ignored. Not only do these neglected joints provide stability, but also, by their shape, size, and orientation, they govern the type and extent of spinal movements.

Embryologically, the discs, laminæ, transverse processes, and ribs, with their articulations, are of *segmental origin* while the vertebral bodies comprise portions of *two adjacent segments*. The fundamental spinal unit is therefore the intervertebral joint complex (I.V.J.C.) (Schmorl's "motor segment").

The nerve-supply of the I.V.J.C. comes from elements

1. Silverman, M., Gardiner, R. C., Condit, P. T. *J. nat. Cancer Inst.* 1958, **20**, 71.
2. Chanarin, I., Bennett, M. C. (in the press).
3. Baldridge, R. C. *J. biol. Chem.* 1958, **231**, 207.
4. Zenisek, A., Kral, J. A. *Biochem. biophys. Acta*, 1953, **12**, 479.
5. Acheson, R. M., Paul, R. M., Tomlinson, J. R. V. *Canad. J. Biochem. Biophys.* 1958, **36**, 295.
6. Whitehead, R. G., Arnstein, H. R. V. *Nature, Lond.* 1961, **190**, 1105.

derived from the related segmental components of the nervous system.[1] It includes all modalities of nerve function—sensory, autonomic, motor, proprioceptive, &c.

Mechanical and/or pathological interference with the normal functioning of the components of the I.V.J.C. applies noxious stimuli primarily to the nerve-endings in the affected structures (i.e., capsule ligaments, joint surfaces, annulus, or muscle). Secondarily, noxious stimuli are applied, by angulation, pressure, or traction, to related nerve fibres or trunks. The impulses generated by primary stimuli are conducted via normal pathways to the central nervous system. Those generated by the secondary stimuli are propagated both centrally and peripherally, the latter being manifested in the associated dermatomes, myotomes, and scleratomes. They may also affect vascular and visceral structures having a related nerve-supply. These referred effects are manifest as pain, hyperæsthesia or hypoæsthesia, muscle spasm, vasomotor, and/or visceral symptoms. In other words, these effects are observed as components of a syndrome due to I.V.J.C. dysfunction (the I.V.J.C. lesion).

This hypothesis provides a definition of the previously elusive and undefined "osteopathic lesion", which is merely a component of a syndrome, and not necessarily, as it is commonly held to be, the primary cause.

But the hypothesis does more than this. It offers an explanation of why discs degenerate, and why they degenerate *individually* throughout the spine for reasons other than a process of ageing or repeated trauma. Ageing might be expected to occur uniformly throughout the spine, and trauma to be most evident in regions most exposed to it—neither of which is the case. *If it is looked for*, disc degeneration can be observed scattered throughout the spine.

Roaf [2] has pointed out that discs with a healthy nucleus do not herniate even under extreme pressure. Schmorl [3] has shown that fracture of the vertebral body is a more likely consequence of pressure. Mitchell [4] has proved that certain chemical changes must occur before a disc can herniate. What then predisposes the individual disc to the onset of such changes? Ring [5] has demonstrated that interference with the innervation of immature long bones results in hyperæmia of the metaphysis followed by degeneration if the hyperæmia is prolonged.

Is it then too unreasonable to suggest that the primary cause of disc degeneration might be vascular changes induced in the annulus, end-plate, and vertebral body by impulses initiated in Stilwell's plexus by I.V.J.C. dysfunction?

Hill Crest,
Natal,
South Africa.

PHILIP H. DALGLEISH.

1. Stilwell, D. R. *Anat. Rec.* 1956, **125**, 139.
2. Roaf, R. *J. Bone Jt Surg.* 1960, **42B**, 810.
3. Schmorl, G., Junghanns, H. The Human Spine in Health and Disease. London, 1959.
4. Mitchell, P. E. G., Hendry, N. E. C., Billewicz, W. Z. *J. Bone Jt Surg.* 1961, **43B**, 141.
5. Ring, P. A. *ibid.* p. 121.

THE DUMPING SYNDROME

SIR,—In their interesting paper of Sept. 23, Mr. Cox and Mr. Allan attributed the dumping syndrome to vascular dilatation.

In this hospital we have examined and treated 60 patients who had this syndrome after subtotal gastrectomy (Billroth I and II). 39 were males and 21 females, and the average age was 45, the youngest being 21 and the oldest 67. Most of them underwent operation years after the onset of their disease. During the interval between onset and operation many were on a strict diet and, moreover, many of them ate little fruit or vegetables.

We first determined the food requirements of our patients, corresponding to their sex, age, occupation, and nutritional state. As our patients were all undernourished and all showed some clinical signs of hypovitaminosis (particularly for vitamins C and B_1), anæmia, and loss of body protein and fat, we tried to treat them dietetically.

Our first problem was the introduction of the necessary quantity and quality of food to patients who were "dumping" severely. We tried to alleviate their symptoms with small doses of chlorpromazine, and we divided the day's food into 8 or 10 parts, giving it when possible in dry form, with the fluid intake between meals.

In most cases the symptoms decreased in 6 to 8 days, and we continued the treatment up to 4 weeks. Our patients gained an average of 2·8 kg.; the body fat and protein became normal in 42 patients and increased in the other 18 patients. The patients' complaints became much less in 8 to 12 days, and in 2 to 4 weeks 35 patients were completely free from symptoms, 19 patients were very much improved, and only 6 had slight residual complaints.

We feel that the syndrome must be due to deficiency of essential foodstuffs, particularly the vitamin-B complex and perhaps some essential aminoacids. We believe that deficiency of these factors disturbs the carbohydrate metabolism of the nervous tissues and is thus responsible for the exaggerated reactions and lability.

Gastroenterological Hospital,
Visegrád, Hungary.

I. SOMOGYI
I. KUKOR.

SPECIAL CONDITIONS IN NORMAL AND TUMOUR NUCLEI

SIR,—In the cells of the adenocarcinoma of the pancreas which I observed in an adult female pine snake *Pituophis melanoleucus*, a special condition of the interphase nucleus was found.

After fixation of the tumour tissue with Zenker's fluid with acetic acid,[1 2] alcohol/formalin/acetic acid, or sublimate/acetic acid, phase contrast and examination with polarised light revealed abnormal nuclei containing besides the common nuclear components refractile elements of the nuclear sap, fine refractile granules, coarse acidophilic granules, and birefringent crystals. Microscopically these elements were investigated for their content of protein, lipid, polysaccharide, and nucleic acid.[3] The results are summarised in the accompanying table. This special condition of the interphase nucleus was also

CHEMICAL CONSTITUTION OF THE COMPONENTS OF THE ACIDOPHILIC-REFRACTILE NUCLEI

Substances	Refractile elements of the nuclear sap	Fine refractile granules	Coarse acidophilic granules	Birefringent crystals
Protein	Present	Probably present	Present	Present
Lipid	Probably not present	Cannot be determined	Probably not present	Present
Polysaccharide	Absent	Cannot be determined	Absent	Absent
Nucleic acid	Absent	Cannot be determined	Absent	Absent

observed in normal liver and kidney cells, the difference being that the frequency was considerably lower than in the tumour tissue. Good correspondence was observed between the special conditions of the interphase nucleus in this case and those described in tissues of man, rabbit, hamster, mouse, frog,[3] and some spontaneous tumours of lower vertebrates.[4]

Green [3] stated three possibilities concerning the nature of the special condition of the interphase nucleus: (*a*) the condition may be involved in a pathological process, such as the development of tumours; (*b*) the condition may be the visible expression of a more general type of a pathological response,

1. Opie, E. L. *J. exp. Med.* 1946, **84**, 91.
2. Serra, J. A. *Stain Tech.* 1946, **21**, 5.
3. Green, E. U. *Cancer Res.* 1949, **9**, 267.
4. Stolk, A. *Nature, Lond.* 1958, **181**, 1739; *Proc. kon. ned. Akad. Wet.* (in the press).

or be due to a special infective agent; or (*c*) the condition may represent an accumulation of normally occurring substances.

In the case of adenocarcinoma of the pancreas in the pine snake the special nuclear condition was found without exception in a fair proportion of the tumour cells, whereas in the normal tissues of the liver and the kidney only a few nuclei showed this condition. Therefore we are of the opinion that in the pine snake the special nuclear condition is probably involved in the process of tumour development.

Department of Histology,
Free University, Amsterdam. A. STOLK.

PRISON DOCTORS

SIR,—Your leading article of Oct. 7 described the Prison Medical Service as almost a backwater. This description wrongly implies stagnation, and it is only correct to say there have been considerable developments in recent years whereby inmates of these establishments are now afforded treatment which compares favourably with National Health Service standards, despite the overriding necessity for security.

The Service provides pathological laboratories and X-ray facilities, and physiotherapy and venereal disease clinics in many of the large prison hospitals. The prison medical officer is not encumbered by red tape and is allowed every freedom in his clinical work. Being, however, a public servant he must of necessity provide reports to official bodies. The Service is not in any way dictatorial, except as regards the Official Secrets Act and the preservation of anonymity of cases. It is this alone which might prevent the publication of interesting work and comment. The dictatorial element has been steadily diminishing during the past decade. There are now 56 full-time medical officers and 66 part-time medical officers.

The Service affords training and instruction in forensic and correctional psychiatry unequalled in any other field of medicine. Such training is, in fact, part of the Maudsley D.P.M. course, and candidates for the diploma attend Brixton Prison for three months. Senior medical officers at other establishments give lectures for the D.P.M. course at other universities. The Service deals with a population entirely different from that of the National Health Service and provides a concentration of clinical material only occasionally to be found in the mental-health and general hospital service.

It is quite wrong to say that the prison doctor is isolated from outside medical colleagues—it is entirely a matter for the individual doctor. The Service provides access to outside hospital facilities when necessary, and with the introduction of the Mental Health Act of 1959 the prison doctor is in day-to-day contact with outside consultants and clinics. The prison medical officer is transferred from one establishment to another, but invariably he is asked whether he will transfer, and it is generally accepted that such transfers are necessary for experience.

The Commissioners have shown willingness to provide facilities for extramural studies but have been restricted by shortage of staff. This shortage is emphasised by a failure to recruit new entrants, and could be partly overcome by increasing the career value of the Service with upgrading of posts for senior and principal medical officers. The late Sir Norwood East said that it took six years to train a prison medical officer, and as the Civil Service Commission's standard for establishment on entry into the Service is very high, surely it is reasonable to suggest that at the end of that period, which might include extramural studies, he would have the experience and knowledge of his specialty to be graded a consultant in that specialty, and be in a better position than a consultant outside the Service to decide the most difficult problem of treatment of inmates. It has to be emphasised that treatment of inmates is governed by many factors other than academic and medical consideration.

What problems, particularly those of recruitment to the Service, would amalgamation with the National Health Service solve? What problems exist that are not already covered by the Prison Act of 1952 and by the present liaison with the National Health Service? In brief, we can see no advantage for the Prison Medical Service or for the prison medical officer in amalgamation with the National Health Service.

Apart from these observations, we agree with the main tenor of your article.

RICHARD NUNN
General Secretary, Institution of Professional Civil Servants.
London, W.C.2.

LATE APPEARANCE OF LEG SYMPTOMS IN PULMONARY EMBOLUS

SIR,—Dr. Stevens' article last week is interesting and instructive. Pulmonary embolism is so common and yet so easily missed that one wonders if there is any helpful sign of venous thrombosis in the legs. There may not be any early symptoms, as Dr. Stevens points out, but there is one early sign and that is localised tenderness.

If the thumb is placed over the upper end of the tibia and the fingers pressed very firmly into each belly of the gastrocnemius, this will produce localised tenderness. The patient often remarks that such pressure is bound to hurt. They are surprised when four hours after the administration of intravenous heparin the tenderness is less. In my experience ordinary palpation of the legs or dorsiflexion of the foot have not been helpful in the early stages.

If in all chest cases the legs were palpated at the initial examination it would be apparent how often a pulmonary embolus is the cause. Apart from patients with respiratory symptoms there is another group. A pulmonary embolus in a person whose E.C.G. shows ischæmic changes is diagnosed as a cardiac infarct.

Eastbourne. ANTHONY CHURCHER.

CONTAMINATION OF MILK BY RADIO-IODINE

SIR,—Miss George (Nov. 4) refers to the prolonged inhibition of radio-iodine uptake by the thyroid for three months after an intravenous pyelogram, and her letter suggests that an equally long inhibition may occur after oral iodides, as in cough mixtures.

Following observations to confirm the speed and completeness with which oral iodides in pharmacological dosage inhibit further radio-iodine uptake,[1] one of us (A. J.) has examined the length of time during which thyroid iodine uptake continues to be depressed following such a dose. Thyroid uptakes were measured by profile counting methods at 3 hours after an oral test dose of ^{132}I, before a 200 mg. oral dose of iodide, and at various intervals after it. This work is continuing and will be published, but preliminary data on three subjects are consistent in showing that the uptake is small at 1 day after iodide, is still only about 20% of normal at 2 days, but has returned to about 50% of normal at 3 to 4 days after the dose. It would seem, therefore, that doses every few days, rather than a single dose, would be required to suppress thyroid uptake of radio-iodine during any prolonged period of high milk contamination with ^{131}I. It is not intended that observations will be made on children, but some evidence suggesting a rather faster iodine turnover than in adults might indicate a need for more frequent and perhaps daily doses if ^{131}I uptakes were to be kept at a low value.

The alternative to the use of dried milk that is suggested by Miss George, therefore, would seem to require repeated pharmacological doses of iodide during any period of high milk contamination rather than the use of such a dose once only. The merits of the alternative

1. Pochin, E. E., Barnaby, C. F. *Hlth Physics* (in the press).

would therefore depend in part upon the possibility of encountering the very occasional individuals who are unusually sensitive to repeated pharmacological doses of iodides, if populations of tens or hundreds of thousands of infants were being protected in this way rather than by the use of dried milk.

Department of Clinical Research,
University College Hospital Medical School,
London, W.C.1.

ANN JOHNSON
E. ERIC POCHIN.

SURGERY IN EMPHYSEMA

SIR,—In addition to your annotation of Oct. 14 and the comment of Mr. Belcher and Dr. Capel, I should like to make three points:

Firstly, most of these cases are bad operative risks and the sooner the chest is opened and closed the better they are. Any form of resection is quite unnecessary even though the whole lobe may be replaced by a cyst. A transfixion suture in the neck of the cyst is all that is required. The excess is cut off, leaving a fringe which is sutured over the stump. This takes, perhaps, three or four minutes.

Secondly, in bilateral cases moderate hypothermia without warming is useful at the first operation if the ventilatory function is very low. This protects the patient during operation and for about 12 hours postoperatively.

Thirdly, although, as pointed out by Mr. Belcher and Dr. Capel, excision of cysts occupying a quarter or a third of a lung field may produce little improvement, these cysts should be excised if radiological studies show a steady enlargement, since sooner or later they will reach a size where operation becomes imperative.

Clare Hall Hospital,
South Mimms, Barnet.

T. W. STEPHENS.

MANAGEMENT OF TETANUS

SIR,—I have given patients with tetanus smaller doses of anti-tetanus serum than are usually recommended, and toxoid. The results have been encouraging.

26 patients were treated at the Railway Hospital, Bhusaval, 10 in 1956, 7 in 1957 and 9 in 1958. The 17 in 1956 and 1957 were given the usual large dose of anti-tetanus serum (A.T.S.): mild cases received two doses of 100,000 international units intramuscularly in the first forty-eight hours, and 20,000–40,000 units intramuscularly daily thereafter; more severe cases received two doses of 100,000 units (one intravenously) on admission, and 40,000 units a day intramuscularly for four or five days. No patient was given more than 400,000 units in all. 400,000 units of procaine penicillin daily, and 1 to 5 ml. of paraldehyde intramuscularly at intervals of two to six hours (depending upon the age and the frequency of spasms) were also administered to control spasms.

In the later part of 1957, I modified this treatment and started giving 1 ml. of tetanus toxoid. 12 patients were given this. The dose of A.T.S. was also reduced. In 10 patients (1 in 1957 and 9 in 1958), I gave A.T.S. in doses of 10,000 to 40,000 units on admission (depending on the severity of the disease), all of it intramuscularly, and 10,000 units daily thereafter; no case was given more than 40,000 units. Those with lockjaw received 10,000 units, those having spasms 40,000. 1 patient in 1958 with mild and early disease was given no A.T.S. and survived. He was, however, given toxoid 1 ml. daily. The same dose of penicillin was administered, together with 0·5 g. of streptomycin.

In 1958 the patients were treated in open, well-lit, and airy wards and no special nursing was arranged. The other 17 were kept in special cubicles in the isolation block which were darkened and without fans in the mistaken belief that light, noise, and the breeze from the fan aggravated spasms. The darkness, in fact, merely increased the patients' apprehension and made nursing very difficult.

Most patients were fed by mouth. Sometimes they were able to take fluids only. In 4 patients milk feeds were supplemented by intravenous glucose saline. Pethidine 100 mg. intramuscularly relieved muscular pain and cramp in advanced cases in which paraldehyde and phenobarbitone 100 mg. intramuscularly (tried in 6 patients) were ineffective. I did not give hydrocortisone or muscle relaxants; patients were not kept under continuous narcosis and no tracheostomies were performed.

10 patients (6 males and 4 females) died out of 26 (13 males and 13 females). 6 of the patients died within 48 hours of admission.

Their ages ranged from a few months to thirty-nine years. No patients over twenty-five died. Mortality by age was:

Age (yr.)	*No. of patients*	*Survived*	*Died*
0–1	3	0	3
2–4	3	2	1
5–9	7	5	2
10–14	4	4	0
15–19	1	0	1
20–24	3	0	3
25–29	1	1	0
30–34	3	3	0
35–39	1	1	0
40–	0	0	0

The 7 wounds were injuries to the feet from nails or glass, and in 6 tetanus developed after minor abrasions which often escaped notice.

When smaller doses of A.T.S. were used only 1 patient died out of 10, whereas of the earlier 16 patients who received up to 400,000 units, 9 died.

Dose (units)	*No. of patients*	*Survived*	*Died*
0–40,000	10	9	1
200,000–400,000	16	7	9

Of the 12 patients given toxoid, 2 died, 1 shortly after admission.

	No. of patients	*Survived*	*Died*
Given toxoid	12	10	2
Not given toxoid	14	6	8

In the prognosis of tetanus there are many questions to which there is no satisfactory answer, and it is often hard to explain why some patients survive yet others die. Caution is therefore needed before concluding that any particular line of treatment is an advance. Nevertheless, though this is only a small series, the results are suggestive and it is my impression that a smaller dose of A.T.S. combined with daily toxoid administration may have helped to reduce mortality.

P.O. Maligaon Railway Headquarters,
Assam, India.

S. L. MALHOTRA.

LOCALISING STENOSIS BY JUGULAR-NOTCH AND THYROID-CARTILAGE AUSCULTATION

SIR,—Since the invention of the stethoscope the human body has been subjected to extensive "wire-tapping"—from the sinciput to the popliteal fossa and beyond, from the evasive eustachian to the more popular fallopian tube. Yet, in diagnosis, noises in the neck have been neglected; only arterial bruits and some venous hums [1] have achieved respectability.

Stridor, while readily audible even at a distance, needs to be quickly localised. "In any case (of stridor), inspection of the larynx (indirect or direct), of the trachea and of the main bronchi . . ." has been recommended.[2] This is easier said than done: considerable experience and preparation are needed for indirect laryngoscopy in an excited, struggling, and salivating patient, to say nothing of direct laryngoscopy or bronchoscopy.

I have found auscultation at the jugular notch and in the laryngeal area valuable. Under normal conditions, with a small bell, the airstream passing through the larynx and the trachea can be distinguished from the heart sounds. The sound of the airstream is very distinct and "close to the listener's ear", much more so than at other places on the neck or chest. The normal lung sounds are "overshadowed" by this airstream. But when the lung is diseased, râles, rhonchi, &c., can be

1. Cary, F. H. *New Engl. J. Med.* 1961, **264**, 869.
2. French's Index of Differential Diagnosis (edited by A. H. Douthwaite); p. 833. Bristol, 1960.

heard at the jugular notch. When the larynx is severely stenosed the site of stenosis can be localised; and the stridor is loudest at the thyroid cartilage. The loudness of the stridor diminishes when the stethoscope bell is placed either over the jugular notch or moved cranially or dorsally from the thyroid cartilage. The bell should be placed over the right or left plate (lamina) of the thyroid cartilage, not in the midline. If the stenosis is only relative (e.g., when the width of the larynx is 3 mm. or more), there is no stridor. If the stridor is very loud the noise should be muffled by placing a piece of cloth or felt between the bell and the skin. This will help with localisation. Talking, groaning, &c., makes auscultation impossible and should therefore be discouraged.

The following case-histories illustrate the usefulness of the method.

CASE 1.—A 54-year-old man had been in another hospital for one week, and severe acute bronchitis was diagnosed. When admitted to our hospital, there was inspiratory stridor, audible at a distance of 20 ft. He was cyanosed, restless, and salivating. There were many râles and rhonchi throughout the chest. By auscultating the neck the stenosis was located in the larynx. Immediate tracheostomy was performed, without waiting for a chest X-ray. An X-ray, taken next day, showed many round shadows in both lungs. The obstruction in the larynx was found to be due to cancer, which had metastasised to both lungs. This was verified at necropsy two weeks later.

CASE 2.—A 67-year-old man came to our hospital because he suddenly became unable to close his mouth. He had been taking an antibiotic for two days. The tongue was so swollen that it was impossible to examine the throat and larynx. No stenosis was found on auscultating the neck. Drug-induced allergic swelling of the tongue was diagnosed; and the patient was given frequent small doses of adrenaline, anti-histamines, and 10% glucose in water intravenously. A few hours after admission, a lateral X-ray of the neck revealed only swelling of the tongue and a slight blunting of the free edge of the epiglottis. Forty hours after admission these had reverted to normal. The patient had been able to maintain a good airway via the nose, the epipharynx and oropharynx, and the larynx. Auscultation of the neck was of great help before the X-ray could be taken.

Investigations with electronic devices are being undertaken.

Phœnix, Arizona, U.S.A. HUBERT J. ADLER.

SIDE-EFFECTS OF TRANYLCYPROMINE

SIR,—I should like to record a third case of severe headache with transient hypertension caused by tranylcypromine.

A colleague aged 48 was about to begin an operating-list when he was suddenly seized with violent occipitofrontal headache accompanied by prostration and vomiting. When seen four hours later he was mildly photophobic but had no neck rigidity, and Kernig's sign was negative. His pulse was regular (80 per min.) but the blood-pressure was 220/120 mm. Hg. He was sweating profusely and had increased reflexes in the left upper limb but the rest of the C.N.S. was normal. The results of lumbar puncture the same evening were normal. Urinary pressor amines were within normal limits, and so was an intravenous pyelogram. The intravenous phentolamine test was negative. In the twenty-four hours after the initial episode, the blood-pressure fell rapidly to normal but bitemporal headache persisted for five days. He gave a clear history of taking a preparation containing tranylcypromine for two weeks previously, and the pattern of his illness follows closely that described by others.

The initial diagnosis was subarachnoid hæmorrhage; and phæochromocytoma was also considered. The true nature of the condition was only apparent after reading Dr. Aldridge and Dr. Oakley's letter of Oct. 21.

Sutton Coldfield, Warwickshire. B. H. BASS.

Parliament

Shortage of Doctors

In the debate on the address in the House of Lords on Nov. 2, Baroness SUMMERSKILL said that the foundation of a good health service was a good and adequate staff. Yet our hospitals today could not continue with their present scale of medical-officer establishments unless Indian, Pakistani, Jamaican, and West African doctors were employed in large numbers. In the Army the most grave technical shortage was the shortage of doctors. One of the greatest needs in the social services of the Commonwealth was the need for doctors. The criticism of those who attributed this shortage of doctors to deficiencies in the National Health Service could be discounted, because in the United States, where private enterprise dominated the medical profession, there was also a serious shortage. In the latest report of the University Grants Committee the numbers of students in the University of London medical schools were given as: men, 4813; women, 1236. She assured their Lordships that this did not reflect the demand for medical education on the part of women; it reflected the quota system which had been devised by governing bodies which were still swayed by Victorian prejudices. In the whole University of London only 22% of the places in the medical schools were taken by women. In the rest of Great Britain the figure was 30%. If the Minister of Health was to succeed in his plans for developing hospitals over the next decade, he must ensure that there was an adequate supply of doctors. She suggested that he should make strong representations to the medical schools to open their doors to women, to abolish this unjust quota, and to allow merit rather than sex to determine who should receive a medical education.

Family Allowances and National Insurance Bill

This Bill, which was introduced in the House of Commons on Nov. 1, seeks to increase by 15*s.* a week the supplements paid to certain totally disabled people who, because their accidents occurred, or their diseases were contracted, before 1948, cannot qualify for benefit under the Industrial Injuries Act. Partially disabled people on maximum compensation will receive increases of existing supplements, or in some cases a new allowance, of up to 10*s.* a week, subject to the Workmen's Compensation loss of earnings rules. There will also be an increase of 7*s.* 6*d.* a week in allowances payable under the Industrial Diseases (Benefit) Acts for uncompensated partially disabled men with pneumoconiosis and byssinosis due to pre-1948 employment. The Bill also seeks to widen the scope of the Industrial Injuries Acts to cover accidents which occur in the course of employment but from "common risks"—e.g., assault or "skylarking", attack by an animal, or being struck by lightning.

Health Visitors and Social Workers Training Bill

This Bill, which was presented by the Health Ministers in the House of Commons on Nov. 2, sets up two councils to promote the training of health visitors and social workers by approving courses and awarding certificates to successful candidates. Initially, the social workers' council would be concerned with social work in the local-authority health and welfare services or in similar services run by voluntary organisations, but its functions might be extended by Order in Council to other fields of social work. Although the councils would be separate bodies, there would be a close working relationship between them, and the chairman and some of the members would be common to both.

Besides the chairman, the health visitors' council would have 29 members. The Health Ministers, in making 12 out of their 13 appointments to it, must consult associations representing health visitors for 8; the British Medical Association and the Society of Medical Officers of Health for 3; and the General Nursing Council

for England and Wales and the General Nursing Council for Scotland for 1. The Health Ministers and Minister of Education would together appoint 5 members after consulting universities and other training bodies.

The social workers' council would have 32 members. The Health Ministers, in making 12 out of their 14 appointments, must consult organisations representing social workers or otherwise concerned with social work for 10; and the British Medical Association and the Society of Medical Officers of Health for 2. The Health Ministers and Minister of Education would together appoint 7 members after consulting universities and other training bodies.

The Bill also confers power to promote research into local-authority health services. It follows, in the main, the recommendations of the Jameson report on health visitors and the Younghusband report on social workers.

This Year, Next Year

The Offices Act 1960, which was introduced by a private member, authorises the Home Secretary to regulate the conditions of employment in offices. It should come into force on Jan. 1. In July, 1960, the Government announced that before that date they intended to introduce comprehensive legislation, based on the Gowers report, which would cover the health and welfare of workers in shops, offices, and railway premises. There was no mention of this Bill in the Queen's Speech, and in a written answer on Nov. 1 Mr. J. H. HARE, the Minister of Labour, said that the programme for the current session was so full that it had reluctantly been decided that there would be no time for this "complex and far-reaching" measure. The Government Bill would therefore be deferred until the 1962–63 session. He added that since legislation of this kind was to be introduced in the autumn of 1962 no action would be taken in the meantime to implement the Offices Act.

QUESTION TIME

Means of Identification

Mr. KENNETH ROBINSON asked the Minister of Health if his attention had been drawn to the joint memorandum of the Medical Defence Union and the Royal College of Nursing [1] relating to surgical operations performed on the wrong patient and on the wrong part of the body and what steps he was taking to ensure that such errors were eliminated in future.—Mr. POWELL: I propose to ask hospital authorities to review their relevant procedures. Mr. ROBINSON: Is the Minister aware that, quite apart from the cases which have been successfully hushed up, there have been 28 known cases of this kind within the past two years? Does he not agree that this is the result of scandalous carelessness? Will he give an undertaking that the recommendations of the memorandum, which should make it impossible for mistakes of this kind to occur, will be brought to the attention of hospital authorities and that they will be asked to adopt these procedures?

Mr. POWELL: In answer to the second part of the question, I propose to do that, though some modification may be desirable, and I will ask hospitals in the first instance to review their own procedures. I agree that these are all avoidable accidents, and no step should be overlooked which might prevent their occurrence.

Mr. ELWYN JONES: What have these surgical errors cost the National Health Service in damages or compensation?—Mr. POWELL: I cannot trace that there have been claims in respect of all or, indeed, the majority of them.

Hostels for Mental Patients

Mr. L. A. PAVITT asked the Minister how many local authorities had provided residential hostels for patients on discharge from mental hospitals—Miss EDITH PITT replied: 7 authorities have had loan sanction specifically for this purpose. To date 4 hostels have been completed and work started on 4 others. Mr. PAVITT: In view of this appallingly low figure, will the hon. Lady do what she can to secure greater financial resources to local authorities to encourage them to proceed with this most important work?—Miss PITT: I do not think that the answer is greater loan sanction. Local authorities have tended to concentrate on the provision of training centres for the mentally subnormal. I hope that more and more of them will now be able to turn their attention to the provision of hostels for the mentally ill.

Mr. ROBINSON: Is the hon. Lady aware that the provision of this type of hostel is probably the first priority for the hospital authorities, and that they have asked local authorities to make this provision and the response has been very disappointing? What can she and her right hon. Friend do to encourage local authorities to build more hostels?—Miss PITT: Local authorities are aware of the importance that we attach to the provision of these hostels which have such a part to play in the full implementation of the Mental Health Act. We certainly encourage them so to do. The fact that we now have before us the ten-year hospital development plans will show what progress is being made.

1. See *Lancet*, Oct. 28, 1961, p. 990.

Inconvenient Turnstiles

Dame IRENE WARD asked the Minister of Housing and Local Government and Minister for Welsh Affairs whether he would make a statement on the use of turnstiles in public conveniences—Dr. HILL replied: Returns from 1454 local authorities—95% of the total—show that of their 12,000 public lavatories only 670 were equipped with turnstiles; of these, 525 were in women's and 145 in men's lavatories. In the past five years people have been trapped on at least 150 occasions, and on 12 of these people were injured. In the same period turnstiles broke down something over 2200 times; nearly all of these were caused by the use of bent pennies. The cost of replacing existing turnstiles would be of the order of £150,000. There would also be an appreciable loss of revenue. I am satisfied that turnstiles are unsatisfactory and I am making permanent the temporary ban on the granting of loan sanction for their installation. Further, I am asking local authorities to remove existing turnstiles as soon as they can.

Obituary

LEONARD ABRAHAMSON

B.A., M.D. Dubl., F.R.C.P.I.

Dr. Leonard Abrahamson, who died at his home in Dublin on Oct. 29, at the age of 65, was senior visiting physician to the Richmond Hospital, Dublin, and professor of medicine of the Royal College of Surgeons in Ireland.

He was educated at Dublin University, which he entered with a sizarship in Irish and Hebrew. After a distinguished career in the arts school, where he became a scholar in modern languages, he joined the medical school. There he gained first place in all subjects at every examination, including the final examination, and was awarded the FitzPatrick medal and travelling prize. He qualified in 1919, and after postgraduate work in Paris he was appointed assistant physician to Mercer's Hospital in Dublin, where he established the first cardiological unit in Ireland in 1922. The same year he was elected F.R.C.P.I. At a very early age he was elected professor of pharmacology and therapeutics of the Royal College of Surgeons in Ireland—a chair now held by his eldest son. He gave up this chair on his appointment to the professorship of medicine. He joined the staff of the Richmond Hospital in 1932. He was a past president of the Royal College of Physicians of Ireland, of the section of medicine of the Royal Academy of Medicine of Ireland, and of the Dublin University Biological Society. He was a member of the Association of Physicians of Great Britain and Ireland and a founder member of the British Cardiac Society.

A memorial service for Sir James Stirling Ross will be held at the Royal Air Force Church of St. Clement Danes in the Strand, London, W.C.2, at noon on Tuesday, Nov. 14.

Notes and News

THE NURSE'S CASTLE

THE idea that a nurse is a single woman who works full-time in a hospital and lives there in a small bedsitting-room dies hard. In fact, today about two-thirds of our nurses live outside the hospital, many of them are married, many work only part-time, and quite a number are men. Unfortunately the accommodation that the hospitals offer is still often traditional rather than realistic and does not meet the needs of their staffs. Some constructive changes are suggested in a useful report which has lately been issued by the Royal College of Nursing.[1]

The report is based on replies to 1810 questionnaires which were returned by a representative sample of nurses from England, Wales, and Scotland. The replies divided the nurses into those who lived out (64%) and those who lived in (36%). These figures may not always truly reflect personal inclination. For those in administrative grades residence was often a hospital requirement, and some of these nurses would have preferred to live outside the hospital. The report suggests that, regardless of rank, any member of the staff who has to live in to suit the hospital's convenience should be offered at a nominal charge at least a bedroom and private sitting-room away from the working area, with facilities for having meals there. Many nurses are married, or responsible for the care of an elderly relative, and accommodation for two people would not be unreasonable. The difficulties of the married nurse, whether husband or wife, are seldom considered, and many hospitals in isolated positions might find it helpful in recruiting and keeping staff and in arranging for shift work to be able to offer adjacent self-contained accommodation to rent or a loan for the purchase of a nearby house or flat.

But in the future clearly by far the greater part of our nurses are going to live away from the hospital. Their work, of necessity, entails night duty, split shifts, awkward hours; suitable provision in the way of changing-rooms, rest-rooms, baths, and showers would compensate them for these inevitable occupational handicaps. But it is not fair to expect them to share the rooms provided for the residential staff, who may well resent the presence of these visitors in what is after all their home. Those who are planning our new hospitals will find many sensible suggestions in this report; indeed some of them could usefully be tried in our present ones.

CHAIR OF MILITARY MEDICINE AT R.A.M. COLLEGE

THE Royal College of Physicians of London, at a meeting of comitia on Oct. 26, agreed to associate itself with the chair of military medicine at the Royal Army Medical College, Millbank, S.W.1. The College of Physicians will act in an advisory capacity with regard to appointments to the chair of military medicine and to further research in clinical medicine in the Army.

A MODEST CENTENARIAN

A HUNDRED years ago the third cottage hospital in England was started by Dr. John Moore at Bourton-on-the-Water with one regular nurse who had " occasional assistance ". The total expenditure for the first year was £130 9*s*. 2½*d*. and there was a balance of £30 14*s*. 7½*d*., from which the committee " hoped to buy a bath ". Probably they did, for the hospital's record is one of enterprise, thrift, and modest expansion. In 1879 it moved to a two-storey house and doubled the number of its beds. (The new hospital had 8–10 beds.) In 1928 it moved again, this time to a completely new building, the gift of Mr. G. F. Moore, the son of the founder. In 1948 the hospital became part of the National Health Service, and it has completed its century as part of the Banbury and district hospital group. The H.M.C., on which a member of the Moore family sits, has issued a pamphlet to mark the occasion.

1. Accommodation for Nurses and Midwives. 1961. Pp.72. From the College, Henrietta Place, Cavendish Square, London, W.1. 7*s*. 6*d*. post free.

University of Cambridge

In commemoration of the centenary of the birth of Sir Frederick Gowland Hopkins, Dr. Joseph Needham will give a lecture on Monday, Nov. 20, at 5 P.M., in the Mill Lane lecture-rooms. He will speak on Gowland Hopkins' life and work.

University College, Ibadan, Nigeria

Dr. Hugh Jolly has been appointed professor of pædiatrics for one year, on secondment from Charing Cross Hospital, London.

Huxley Lecture

Dr. A. E. Mourant will give this lecture on Friday, Nov. 24, at 5.30 P.M., in the rooms of the Royal Society, Burlington House, Piccadilly, London, W.1. He will speak on evolution, genetics, and anthropology. The Huxley medal for 1961 will be presented to him.

Institute of Biology

Dr. J. M. Tanner will give a Darwin lecture on Wednesday, Dec. 6, at 5.15 P.M., at the British Museum (Natural History), Cromwell Road, London, S.W.7. His subject will be human growth in its comparative and evolutionary aspects.

Respiratory Function and the Clinician

A symposium on this subject is to be held by the Chest and Heart Association on Wednesday, Dec. 13, at the Royal College of Surgeons of England, Lincoln's Inn Fields, London, W.C.2. The speakers will be Dr. Philip Hugh-Jones, Dr. C. B. McKerrow, Dr. J. B. L. Howell, and Dr. E. J. M. Campbell. The fee for the symposium will be two guineas, and further particulars may be had from the Association, Tavistock Square, London, W.C.1.

World Federation of Neurosurgical Societies

Prof. Eduard Busch of Copenhagen has been elected president and Dr. A. Earl Walker of Baltimore secretary of the Federation, and Mr. D. W. C. Northfield secretary of the third International Congress of Neurological Surgery, which is to be held in Copenhagen in 1965.

Congress on the History of Pharmacy

The first British Congress on the History of Pharmacy is to be held at Nottingham University from Sept. 22 to 25, 1962. It is being organised by the faculty of the history of medicine and pharmacy of the Society of Apothecaries with the cooperation of the Pharmaceutical Society and is sponsored by Messrs. Boots Ltd. Inquiries should be addressed to Dr. F. N. L. Poynter, Wellcome Historical Medical Library, the Wellcome Building, Euston Road, London, N.W.1.

Wellcome Wing at Leeds

On Nov. 7 Sir Henry Dale opened the Wellcome wing of the General Infirmary at Leeds which provides accommodation for the departments of urology and medical physics. Afterwards the University of Leeds conferred on him the honorary degree of D.SC.

The new wing has 20 laboratories, 4 workshops, 17 staff rooms, a library, and a conference room. Suites of laboratories have been designed specially for radioisotope research, spectrophotometry, steroid chemistry, chromatography, and pathology. One laboratory has been sited entirely below the ground, to meet special requirements for the measurement of body radioactivity. The top floor, which includes a ward of 11 beds, has been provided from private funds for patients needing clinical and metabolic investigations. The Wellcome Trust contributed £60,000 towards the cost of the building. The remainder some £93,000, was shared by the university and the board of governors.

World Organisation for Early Childhood Education

This Organisation is to hold a world assembly from July 15 to 22 in London. The theme of the meeting will be a Happy and Healthy Coming Generation. Further particulars may be had from 7, Copland Avenue, Harrow Road, Wembley.

International Congress on Nutrition

This congress is to be held from Aug. 9 to 15, 1963, in Edinburgh. Further particulars may be had from the secretary of the congress, department of clinical chemistry, Royal Infirmary, Edinburgh.

International Congress of Psychosomatic Medicine and Childbirth

This congress is to be held from July 8 to 12, 1962, in Paris, under the presidency of Prof. Jean Ravina. Further particulars may be had from Dr. L. Chertok, general secretary of the congress, S.O.C.F.I., 1 ter Rue Chanez, Paris XVI. Prof. Norman Morris is chairman of the British committee.

Sir Harry Platt is visiting Australia and New Zealand, where he will speak in the medical schools on behalf of the appeal of the Royal Australasian College of Surgeons for funds to extend its teaching and training programme in the Southern hemisphere.

Dr. Neville Goodman, a deputy chief medical officer of the Ministry of Health, is visiting Germany, under the auspices of the British Council, at the invitation of the North Rhine-Westphalian health authorities.

Mr. Terence Cawthorne will give the first Sir William Wilde memorial lecture to the Irish Otolaryngological Society in Belfast on Nov. 17. The title of his lecture is to be Tracheostomy, Yesterday and Today.

Dr. Emmanuel Patrick has been appointed full-time physician to the university health service in the University of Malaya at Kuala Lumpur.

A meeting of the Hill End Hospital Medical Society is to be held on Tuesday, Nov. 21, at 8.45 P.M., when Mr. J. C. Ottaway will speak on the Coroner and Other Problems. Other speakers during the spring session will be: Dr. J. B. Randell (Jan. 18); Mr. O. S. Tubbs (Feb. 28); and Mr. Kenneth Robinson, M.P. (April 25). The secretary of the society is Dr. N. B. McDiarmid, Hill End Hospital, St. Albans.

The report of the symposium on renal disease held at the Royal College of Physicians of Edinburgh last March may now be had from the college, 19, Queen Street, Edinburgh, 2 (10*s.* 6*d.* plus 9*d.* postage). It includes Dr. J. S. Robson's Sydney Watson Smith lecture on renal insufficiency.

The Minister of Health is distributing to general practitioners, through the executive councils, a booklet on the *Services available to the Aged and Chronic Sick* which has been prepared by the Standing Medical Advisory Committee of the Central Health Services Council.

Appointments

HOWELL, F. R., M.B. Lpool, D.P.H.: M.O.H., Wallingford and Wantage.
KERTÉSZ, ANDREW, M.B. Lond., M.C.P.A., D.T.M. & H., D.C.P.: consultant pathologist, Merthyr and Aberdare hospital group.
LEWIS, SHIRLEY A., M.B. Brist., D.OBST., D.P.H.: assistant M.O., Hornsey and Tottenham.
PANIKKER, B. N., M.B. Edin.: assistant psychiatrist, Royal Scottish National Institution, Larbert.
SLOCOMBE, G. F., M.B. Lond., D.P.H.: deputy M.O.H. and deputy school M.O., Canterbury.
WILSON, A. S. M., L.R.C.P.E., D.P.H.: school M.O. and M.O.H., Barnard Castle, Co. Durham.

Birmingham Regional Hospital Board:

ALLEN, UNITY R., B.M. Oxon., M.R.C.P., D.C.H.: consultant pathologist, Burton-on-Trent and Lichfield, Sutton Coldfield and Tamworth hospital groups.
COOKE, D. C., F.R.C.S.: consultant surgeon, Dudley and Stourbridge hospital group.
HARDEMAN, MAUREEN E., M.B. Birm., F.F.A. R.C.S., D.A., D.OBST.: consultant anæsthetist, Birmingham (Selly Oak) hospital group.
MACDOUGALL, J. A., M.CHIR. Cantab., F.R.C.S.: consultant surgeon, Wolverhampton hospital group.
ROHAN, R. F., M.B. Lond., F.R.C.S.: consultant E.N.T. surgeon, Birmingham (Dudley Road) hospital group.

Diary of the Week

NOV. 12 TO 18

Monday, 13th

UNIVERSITY OF LONDON
5.30 P.M. (London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1.) Prof. A. V. Neale: Child Health—Past and Present. (First of five Heath Clark lectures.)
POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12
4 P.M. Dr. Brian Ackner: Diagnosis of Organic Mental Syndromes.

Tuesday, 14th

UNIVERSITY COLLEGE LONDON, Gower Street, W.C.1
5.30 P.M. Prof. H. O. Schild: Adventures with Histamine. (Inaugural lecture.)
BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine.) Prof. G. V. R. Born: Blood Platelets.
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
8 P.M. *Psychiatry.* Prof. Glanville Williams, LL.D., Mr. Kenneth Robinson, M.P.: The Law Relating to Abortion.
INSTITUTE OF DERMATOLOGY, Lisle Street, W.C.2
5.30 P.M. Dr. K. V. Sanderson: Abnormalities of Hair Growth.
ST. MARY'S HOSPITAL MEDICAL SCHOOL, Paddington, W.2
5 P.M. Dr. W. Wallace Park: Chorioncarcinoma.
WEST END HOSPITAL FOR NEUROLOGY AND NEUROSURGERY, 91, Dean Street, W.1
5.30 P.M. Mr. G. C. Knight: Surgical Treatment of Mental Illness.
ROYAL ARMY MEDICAL COLLEGE, Millbank, S.W.1
5 P.M. Mr. N. C. Tanner: Postgastrectomy Symptoms.
MANCHESTER MEDICAL SOCIETY
8 P.M. (Clinical Sciences Building, York Place.) *Surgery.* Mr. Eric Vernon: Experiences in Gastric Replacement by Colon. Mr. David Aiken: Treatment of Angiomata.

Wednesday, 15th

UNIVERSITY OF LONDON
5.30 P.M. (London School of Hygiene and Tropical Medicine.) Prof. A. V. Neale: Human Reproduction. (Second of five Heath Clark lectures.)
POSTGRADUATE MEDICAL SCHOOL OF LONDON
2 P.M. Prof. N. H. Martin: Chemical Pathology of γ- globulin.
ROYAL SOCIETY OF MEDICINE
8.15 P.M. *General Practice.* Dr. D. L. Crombie, Dr. J. Vallance Owen, Dr. J. D. N. Nabarro: Diabetes Mellitus—Incidence, Causation, and Management.
INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. Henry Haber: Histology—Precancerous Conditions and Squamous Cell Epithelioma.
INSTITUTE OF DISEASES OF THE CHEST, Brompton, S.W.3
5 P.M. Dr. J. G. Scadding: Diagnosis of Pulmonary Sarcoidosis.
ROYAL FREE HOSPITAL, Gray's Inn Road, W.C.1
5.15 P.M. Dr. J. F. Goodwin: Septal Defects.
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1
3.30 P.M. Dr. K. O. A. Vickery: Problems of Health in a Holiday Resort.
ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION
2.15 P.M. (1, Wimpole Street, W.1.) Prof. J. Z. Young: Memory Mechanisms of the Brain. (Maudsley lecture.)
HARVEIAN SOCIETY OF LONDON, 11, Chandos Street, W.1
8.15 P.M. Dr. A. D. Morris, Dr. J. Aldren Turner, Mr. P. H. Schurr: Parkinsonism.

Thursday, 16th

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Tropical Medicine and Hygiene.) Prof. P. M. Daniel: Pituitary Gland and its Blood Supply.
NUFFIELD ORTHOPÆDIC CENTRE, WINGFIELD-MORRIS ORTHOPÆDIC HOSPITAL, Oxford
8.30 P.M. Dr. C. H. G. Price: Osteogenic Sarcoma and Allied Lesions of the Skeleton.
MANCHESTER MEDICAL SOCIETY
8 P.M. (Staff House, University of Manchester.) *Anæsthetics.* Dr. Andrew Fraser: Clinician or Technician?
LIVERPOOL MEDICAL INSTITUTION
5.15 P.M. (Old Medical School, The University, Liverpool, 3.) Prof. D. V. Hubble: Samuel Johnson in Illness and Death.
UNIVERSITY OF ST. ANDREWS
5 P.M. (Physiology Department, Queen's College, Dundee.) Dr. John Marshall: Current Concepts in the Causation and Management of Cerebrovascular Disease.

Friday, 17th

POSTGRADUATE MEDICAL SCHOOL OF LONDON
10 A.M. Mr. D. R. Davies: Hyperparathyroidism.
4 P.M. Prof. Melville Arnott: Management of Acute Myocardial Infarction.
ROYAL SOCIETY OF MEDICINE
5.30 P.M. *Epidemiology and Preventive Medicine.* Dr. R. R. Willcox: Recent Trends on Prevalence of Venereal Disease.
KING'S COLLEGE HOSPITAL MEDICAL SCHOOL, Denmark Hill, S.E.5
4.30 P.M. Sir Charles Illingworth: Clinical Applications of the Experimental Pressure Chamber. (Thomas Percy Legg lecture.)
FACULTY OF RADIOLOGISTS
4.30 P.M. (Royal College of Surgeons of England, Lincoln's Inn Fields, W.C.2.) Dr. Frank Ellis: Bladder Neoplasms—the Challenge to the Radiotherapist. (Skinner lecture.)
BRITISH TUBERCULOSIS ASSOCIATION
5 P.M. (26, Portland Place, W.1.) Dr. Hugh Ramsay: Integration. (Presidential address.)
BRITISH SOCIETY FOR IMMUNOLOGY
10 A.M. (Wellcome Building, 183, Euston Road, N.W.1.) Symposium on Tissue Antigens. (Opening of 2-day meeting.)
PLYMOUTH MEDICAL SOCIETY
8.30 P.M. (North Friary House, Greenbank Terrace, Plymouth.) Dr. Maurice Partridge: Drug Addiction.